

DRAFT

ENVIRONMENTAL ASSESSMENT

**ON ISSUING AN EFP TO CONDUCT SCIENTIFIC RESEARCH AND EVALUATE CATCH RATES
USING PELAGIC LONGLINE GEAR IN A PORTION OF THE EAST FLORIDA COAST (EFC)
CLOSED AREA OF THE ATLANTIC OCEAN**

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National Oceanic and Atmospheric Administration
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Office of Sustainable Fisheries
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Environmental Assessment on Issuing an EFP to Conduct Scientific Research and Evaluate Catch Rates Using Pelagic Longline Gear in a Portion of the East Florida Coast Closed Area of the Atlantic Ocean

Proposed Action: Issue an EFP to evaluate pelagic longline catches and catch rates of target and non-target species using standardized PLL gear on a specified number of commercial vessels within a portion of the East Florida Coast (EFC) PLL Closed Area to evaluate the effectiveness of existing area closures at meeting current conservation and management goals under current conditions.

Type of Statement: Environmental Assessment

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Abstract: Under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the National Marine Fisheries Service (NMFS) may authorize activities otherwise prohibited by the regulations contained in Title 50, Part 635 of the Code of Federal Regulations for the conduct of scientific research and the investigation of bycatch. This Environmental Assessment (EA) analyzes the impacts associated with issuing an Exempted Fishing Permit (EFP) to evaluate pelagic longline (PLL) catches and catch rates of target and non-target species within a portion of the East Florida Coast (EFC) PLL Closed Area to evaluate the effectiveness of existing area closures at meeting current conservation and management goals under current conditions. The EFP will exempt participating vessels from certain regulatory requirements in the closed area.

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1.0 INTRODUCTION

1.1. Background

The National Marine Fisheries Service (NMFS) under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the Atlantic Tunas Convention Act (ATCA) manages U.S. fisheries for Atlantic swordfish, tunas, billfish, and sharks. Under ATCA, the United States is obligated to implement recommendations of the International Commission for the Conservation of Atlantic Tunas (ICCAT), including those establishing Atlantic swordfish quotas. ICCAT is a regional fishery management organization, currently consisting of 51 contracting parties, which is responsible for the conservation of tunas and tuna-like species (including swordfish) in the Atlantic Ocean and its adjacent seas. In addition to being consistent with ICCAT recommendations, swordfish management measures must also comply with the Magnuson-Stevens Act, the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and other domestic laws. For additional information about the management history of the Atlantic swordfish stocks and other highly migratory species (HMS), please refer to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan (2006 Consolidated Atlantic HMS FMP) (NMFS, 2006) and amendments.

1.2. Purpose, Need, and Objectives for the Action

NMFS closed the Desoto Canyon to PLL gear in 2000, and the EFC and Charleston Bump areas in early 2001 (65 FR 47213, August 1, 2000). The Charleston Bump Closed Area is a seasonal closure from February through April every year, whereas the Desoto Canyon and EFC areas are closed year-round to PLL gear. The closures were implemented to reduce bycatch and incidental catch of overfished and protected species by PLL fishermen who target HMS. At the time, Atlantic blue marlin, white marlin, sailfish, bluefin tuna, and swordfish were overfished, and bycatch reduction was a component of rebuilding efforts. In particular, the U.S. was implementing a 1999 swordfish rebuilding plan, and the closure helped reduce bycatch of juvenile swordfish. Several other laws required that NMFS address bycatch in HMS fisheries, including the Endangered Species Act (ESA), which required reductions in sea turtle bycatch in the PLL fishery. National Standard 9 of the MSA also requires that fishery management plans minimize bycatch and bycatch mortality to the extent practicable. These areas were closed because there was a noticeable difference in the bycatch of some non-target species (mainly undersized swordfish) between the areas that were ultimately closed and the areas that remain open.

The closures have been in place for more than 15 years now and, since 2001, a number of changes in stock status and fishery management measures have occurred. Specifically, North Atlantic swordfish has been rebuilt since 2009, current international assessments of white marlin and Western Atlantic sailfish indicate that overfishing is likely not occurring, the PLL fishery has been required since 2004 to use circle hooks instead of J-hooks to reduce sea turtle bycatch, and individual bluefin tuna quota (IBQ) allocations were implemented in the PLL fishery through Amendment 7 to the 2006 Consolidated HMS FMP in 2014 (79 FR 71509, December 2, 2014). Allowing limited access to the EFC PLL Closed Area for research purposes through an EFP would provide important data from the closed area under these changed conditions.

NMFS has not obtained scientific data related to catch and bycatch rates from this area except for limited research from a similar EFP that was carried out from 2008 – 2010, and that data suggested that more research was needed due to the small sample size and poor spatial distribution of PLL sets

(Kerstetter, 2011). The data resulting from the research under this EFP would be used to assess the current bycatch rates during normal commercial fishing operations and to evaluate the effectiveness of the closed area in continuing to reduce bycatch of non-target species (e.g., billfish, undersized swordfish, prohibited species, and protected species). It would also provide more current data about the socio-economic impact of reduced catches of target species (swordfish and tunas) as a result of the closure, assess changes in species availability and distribution over time, and contribute to future stock assessments or other fishery management measures. Among the purposes of EFPs in the regulations are the “conduct of scientific research, the acquisition of information and data . . . [and] the investigation of bycatch, economic discard and regulatory discard,” and such an EFP would be in furtherance of those purposes (§ 635.32(a)(1)).

Catch and catch rates would be compared between two different sub-areas in the EFC PLL Closed Area (north and south of 29°50' N lat.), and with catch rates obtained from an area outside the EFC PLL Closed Area. A secondary purpose would be to conduct additional research to further evaluate electronic monitoring systems and the feasibility of utilizing electronic logbooks to facilitate real-time reporting. To assist in current efforts to reduce the mortality of incidentally captured dusky sharks without increasing mortality on silky and night sharks, and also to facilitate research on these commonly misidentified species, participating vessels would be required to comply with certain other specified limits and requirements. For example, biological samples of all sharks dead at haul back or retained for sale would be collected to aid in life history and stock assessments. All participating commercial fishing vessels would need to be identified on an exempted fishing permit (EFP) issued to the Principal Investigator to authorize activities that would otherwise be prohibited by the regulations contained in Title 50, Part 635 of the Code of Federal Regulations (CFR). This research project would evaluate the effectiveness and impacts of existing bycatch reduction measures, collect data to examine the effectiveness and/or impacts of the existing EFC PLL Closed Area, assess changes over time in species availability and distribution, and contribute to future stock assessments and fishery management.

In this EA, NMFS considers the ecological, social, and economic impacts of issuing an EFP to evaluate pelagic longline catches and catch rates of target and non-target species using standardized PLL gear on a specified number of commercial vessels within a portion of the East Florida Coast (EFC) PLL Closed Area to evaluate the effectiveness of existing area closures at meeting current conservation and management goals under current conditions.

1.3 Scope and Organization of Document

In considering the proposed action, NMFS is responsible for complying with a number of Federal statutes, including the National Environmental Policy Act (NEPA). Under NEPA, the purpose of an Environmental Assessment (EA) is to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact and to aid in the Agency's compliance with NEPA when no environmental impact statement is necessary.

This document as an EA assesses potential impacts on the biological and human environments associated with approving an EFP for a scientific research project using commercial PLL fishing vessels to evaluate catch and bycatch rates within a portion of the EFC PLL Closed Area using standardized fishing gear and to compare those to rates obtained from an open area. In this document, NMFS evaluates the potential impacts of these alternatives (e.g., biological, social, and economic, see Chapter

4). The chapters that follow describe the preferred action and potential alternatives (Chapter 2), the affected environment as it currently exists (Chapter 3), the probable consequences on the human environment that may result from the implementation of the proposed action and their alternatives (Chapter 4), and any mitigating measures (Chapter 5).

In developing this document, NMFS adhered to the procedural requirements of NEPA, the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 C.F.R. 1500-1508) 28, and National Oceanic and Atmospheric Administration's (NOAA) procedures for implementing NEPA. NOAA Administrative Order (NAO) 216-6 as amended and superseded in part by NAO 216-6A, identifies NOAA's procedures to meet the requirements of NEPA to:

- * fully integrate NEPA into the agency planning and decision making process; fully consider the impacts of NOAA's proposed actions on the quality of the human environment;
- * involve interested and affected agencies, governments, organizations and individuals early in the agency planning and decision making process when significant impacts are or may be expected to the quality of the human environment from implementation of proposed major Federal actions; and
- * conduct and document environmental reviews and related decisions appropriately and efficiently.

The following definitions were generally used to characterize the nature of the various impacts evaluated in this EA. Chapter 4 describes more specifically how these definitions were used for each alternative.

- Short-term or long-term impacts. These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period. Long-term impacts are those that are more likely to be persistent and chronic.
- Direct or indirect impacts. A direct impact is caused by a proposed action and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- Minor, moderate, or major impacts. These relative terms are used to characterize the magnitude of an impact. Minor impacts are generally those that might be perceptible but, in their context, are not amenable to measurement because of their relatively minor character. Moderate impacts are those that are more perceptible and, typically, more amenable to quantification or measurement. Major impacts are those that, in their context and due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 C.F.R. § 1508.27) and, thus, warrant heightened attention and examination for potential means for mitigation to fulfill the requirements of NEPA.
- Adverse or beneficial impacts. An adverse impact is one having unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial impact is

one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.

- Cumulative impacts. CEQ regulations implementing NEPA define cumulative impacts as the “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 C.F.R. § 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time within a geographic area.

2.0 ALTERNATIVES

NEPA requires that any Federal agency proposing a major federal action consider all reasonable alternatives, in addition to the proposed action. The evaluation of alternatives in an EA assists NMFS in ensuring that any unnecessary impacts are avoided through an assessment of alternative ways to achieve the underlying purpose of the project that may result in less environmental harm.

To warrant detailed evaluation, an alternative must be reasonable¹ and meet the purpose and need (see Chapter 1). Screening criteria are used to determine whether an alternative is reasonable. The following discussion identifies the screening criteria used in this EA to evaluate whether an alternative is reasonable; evaluates various alternatives against the screening criteria (including the proposed measures) and identifies those alternatives found to be reasonable; identifies those alternatives found not to be reasonable; and for the latter, the basis for this finding. Alternatives considered but found not to be reasonable are not evaluated in detail in this EA.

Screening Criteria – To be considered “reasonable” for purposes of this EA, an alternative must meet the following criteria:

- *An alternative must be consistent with the 10 National Standards set forth in the Magnuson-Stevens Act.*
- *An alternative must be administratively feasible. The costs associated with implementing an alternative cannot be prohibitively exorbitant or require unattainable infrastructure.*
- *An alternative cannot violate other laws (e.g., Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Atlantic Tunas Convention Act (ATCA)).*
- *An alternative must be consistent with the 2006 Consolidated Atlantic HMS FMP and its amendments.*
- *An alternative must be consistent with the Terms and Conditions of the 2004 HMS PLL Biological Opinion (2004 BiOp).*

¹ “Section 1502.14 (of NEPA) requires the EIS to examine all reasonable alternatives to the proposal. In determining the scope of alternatives to be considered, the emphasis is on what is “reasonable” rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant.” (CEQ, “NEPA’s Forty Most Asked Questions” (available at <http://ceq.hss.doe.gov/nepa/regs/40/40P1.HTM>) (emphasis added))

The following subsections describe the range of alternatives designed to meet the purpose and need for the proposed action.

2.1 Alternative 1 (No Action)

Alternative 1 Do not issue an EFP to conduct research with PLL vessels in the EFC PLL Closed Areas (No Action)

This alternative would not grant the application for an EFP relieving the research vessels from existing regulations, which prohibit PLL vessels from fishing in the EFC PLL Closed Area year-round (see Figure 2-1).

2.2 Alternative 2

Alternative 2 Issue an EFP to conduct year-round research with commercial PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00" N Lat., 79° 50" W. Long. and 28° 0" N. Lat, 79° 50" W. Long. (see Figure 2-2 (point coordinates in Table 2.1a)) with terms and conditions to minimize interactions with and mortality of dusky sharks and other prohibited shark species.

Within the EFC PLL Closed Area, the proposed study area in Alternative 2 (Figure 2-2) would be divided into a northern portion and a southern portion at 29°50' N lat. A third area of operations would be set up with same terms and conditions outside the closed area to provide a comparative baseline for results inside versus outside the closed area. This alternative would authorize a limited number of PLL vessels (six vessels with up to seven "backup" vessels) to deploy approximately 45 sets/vessel/quarter annually using non-offset 16/0 circle hooks or larger (up to 750 hooks per set) distributed equally between the two sub-areas of the EFC PLL Closed Area and outside of the EFC PLL Closed Area for one year to conduct scientific research using standardized PLL gear (see Figure 2-2 and Table 2.1a). The project and its impacts would be evaluated annually and could be reauthorized for no more than two additional years. A maximum of approximately 1,080 research sets (six vessels x 180 sets/year) would be authorized to be deployed annually, with 2/3rds of the sets (720 sets) occurring within the EFC PLL Closed Area and 1/3 (360 sets) occurring in the open area.

Individual vessels would be subject to 33 percent observer coverage (a minimum of 15 observed sets per quarter per vessel with five sets in each of the three sub-areas) using either NMFS-approved observers or scientific research staff. The proposed sample size in Alternative 2 would provide more information per study area and year than currently exists for the entire time series (1992 – 1999), and would provide enough information for statistical comparisons of catch rates and size structure of swordfish and non-target species in the area described in Alternative 2 (Lauretta, 2016).

Vessels would be authorized to conduct this research in the EFC PLL Closed Area and would be required to adhere to otherwise applicable PLL regulations for fishing that normally occurs outside of the closed area, including dehooking and safe handling protocols for sea turtles and other protected species (July 6, 2004; 69 FR 40734). Vessels would be allowed to retain and sell swordfish, tunas, and

sharks subject to otherwise applicable quotas, seasons, minimum sizes, and retention limits at the time of the research project and other legally harvested non-HMS fish to offset the costs of conducting the fishery research operations, including the opportunity cost of forgoing normal commercial operations.

In consultation with shark scientists from both the Northeast (NEFSC) and Southeast Fisheries Science Centers (SEFSC), NMFS has identified the following proposed EFP requirements to limit shark interactions and mortality during operations under this EFP and to ensure that sharks are properly identified, and, importantly, to gather valuable additional information regarding such interactions to inform future management and stock assessments. The terms and conditions would include:

- 1) Fin clips and photographs be safely taken from all live sharks that are not being retained to confirm which species are actually being caught;
- 2) When three dusky sharks have been caught and discarded dead by a fishing vessel, a maximum PLL set soak time limit of ten hours is established for all sets deployed under this EFP;
- 3) if three additional dusky sharks are discarded dead, then that vessel could not make a trip inside the EFC PLL Closed Area for the remainder of the 12-month project period, unless otherwise authorized by NMFS;
- 4) all sharks dead at haul back (including prohibited species) or legally retained for sale would be biologically sampled (e.g., vertebra and reproductive organs removed) and sent to the SEFSC;
- 5) hooks and sets deployed inside and outside the EFC PLL Closed Area must be equipped with hook timers, in accordance with protocols established by NMFS, to determine when animals were captured and when mortality occurs; and
- 6) SEFSC shark scientists would provide training to the researchers, vessel captains, and observers before the project begins to ensure that they understand the distinguishing features and identification methodologies for these three shark species. (We note, however, that while misidentification of sharks generally is problematic, NMFS is confident that during this project, dusky sharks could be distinguished from the other shark species by the authorized samplers because all dead sharks would be required to be brought onboard as a condition of the EFP. This would provide sufficient time for proper shark identification.)

In addition to these measures, NMFS will review data about shark interactions and mortality from the first year of research project operations and will consider additional permit terms and conditions if necessary for any subsequent authorized years.

Collections and harvests of Atlantic HMS would be authorized only when authorized samplers, including observers or vessel captains and crew, are present on authorized vessels. A copy of the EFP must be available for inspection aboard each of the authorized vessels while conducting the authorized activity. A copy of the EFP would accompany all biological samples (vertebra and reproductive organs) during transport.

Vessel operators participating in the research project would also be required to submit electronic logbooks at the end of each set. Additionally, hooks on sets inside and outside the EFC PLL Closed Area would be required to be equipped with a hook timer to determine when animals were captured and when mortality occurred (if applicable). Finally, to assist in current research efforts on shortfin mako sharks, observers would be requested to place a specified number of pop-up satellite archival tags (PSATS) on shortfin mako sharks that are released alive.

All at-sea fisheries observers would use NOAA Pelagic Observer Program protocols and forms to ensure data compatibility with current federal data collection. NMFS would review all at-sea video from the electronic monitoring system maintained by NOAA for sets conducted under this EFP.

For all participating vessels, Digital Globe, Inc. (Herndon, VA, USA; <https://www.digitalglobe.com>) has developed a custom *Insight Explorer* program within its proprietary *Sea Star* software that would establish a time/date and GPS-based geographic location tag for each event entered at sea by the vessel operator; this program is now in final testing, concurrent with the planned deployment of the system in January 2017. The vessel operator would manually enter the species for each capture event during the time of capture, which can then be linked directly to the video feed maintained by NOAA, which is itself time/date tagged. A daily summary of these manual entries would then be automatically compiled by the software and sent via satellite feed at midnight every night to both the researcher (EFP applicant) and vessel owner, which would be compiled into an electronic logbook and thus provide nearly real-time monitoring of the project catches. A copy of this daily summary would also be provided to NMFS, upon request. During the project, a randomly selected set of individual capture events would be pulled from the database, and a request for the respective video feed from that time/date tag would be made to NOAA, who would provide it with the researcher. The video would then be compared by the researcher with the electronic logbook data for the event as an auditing mechanism for the electronic logbooks.

The study would use the electronic logbook data for the purposes of spatial and catch rate analyses, while the at-sea fisheries observer data would be used for length-based analyses. The project would also provide an analysis of the accuracy of the electronic capture event system via the auditing of the NOAA video monitoring data. Audits would be conducted at three-month intervals throughout the duration of the project, and results would be used in ongoing consultations on the project with NOAA.

2.3 Alternative 3 (Preferred)

Alternative 3 *Issue an EFP to conduct year-round research with commercial PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00" N. Lat., 80° 20" W. Long, to 29° 00" N. Lat., 80° 20" W. Long. and then proceeding southward in straight lines located just west of the 100 fathom isobath to 28° 00" N. Lat., 80° 10" W. Long, with terms and conditions to minimize interactions with and mortality of dusky sharks and other prohibited shark species - Preferred Alternative (see Figure 2-3 (point coordinates in Table 2.1b))*

Within the EFC PLL Closed Area, the proposed study area in Preferred Alternative 3 (Figure 2-3) would be divided into a northern portion and a southern portion at 29°50' N lat. This alternative is geographically larger than Alternative 2 and includes the 100 fathom isobath, which is easily identifiable on depth sounders or bathymeters. A third area of operations would be set up with same terms and conditions outside the closed area to provide a comparative baseline for results inside versus outside the closed area. This alternative would authorize a limited number of PLL vessels (six vessels with up to seven "backup" vessels) to deploy approximately 45 sets/vessel/quarter annually using non-offset 16/0 circle hooks or larger (up to 750 hooks per set) distributed equally between the two sub-areas of the EFC PLL Closed Area and outside of the EFC PLL Closed Area for one year to conduct scientific research using standardized PLL gear (see Figure 2-3 and Table 2.1b). The project and its impacts would be evaluated annually and could be reauthorized for no more than two additional

years. A maximum of approximately 1,080 research sets (six vessels x 180 sets/year) would be authorized to be deployed annually, with 2/3rds of the sets (720 sets) occurring within the EFC PLL Closed Area and 1/3 (360 sets) occurring in the open area.

Individual vessels would be subject to 33 percent observer coverage (a minimum of 15 observed sets per quarter per vessel with five sets in each of the three sub-areas) using either NMFS-approved observers or scientific research staff. The proposed sample size in Alternative 2 would provide more information per study area and year than currently exists for the entire time series (1992 – 1999), and would provide enough information for statistical comparisons of catch rates and size structure of swordfish and non-target species in the area described in Alternative 3 (Lauretta, 2016).

Vessels would be authorized to conduct this research in the EFC PLL Closed Area and would be required to adhere to otherwise applicable PLL regulations for fishing that normally occurs outside of the closed area, including dehooking and safe handling protocols for sea turtles and other protected species (July 6, 2004; 69 FR 40734). Vessels would be allowed to retain and sell swordfish, tunas, and sharks subject to otherwise applicable quotas, seasons, minimum sizes, and retention limits at the time of the research project and other legally harvested non-HMS fish to offset the costs of conducting the fishery research operations, including the opportunity cost of forgoing normal commercial operations.

In consultation with shark scientists from both the Northeast (NEFSC) and Southeast Fisheries Science Centers (SEFSC), NMFS has identified the following proposed EFP requirements to limit shark interactions and mortality during operations under this EFP to ensure that sharks are properly identified, and, importantly, to gather valuable additional information regarding such interactions to inform future management and stock assessments. The terms and conditions would include:

- 1) Fin clips and photographs be safely taken from all live sharks that are not being retained to confirm which species are actually being caught;
- 2) When three dusky sharks have been caught and discarded dead by a fishing vessel, a maximum PLL set soak time limit of ten hours is established for all sets deployed under this EFP;
- 3) if three additional dusky sharks are discarded dead, then that vessel could not make a trip inside the EFC PLL Closed Area for the remainder of the 12-month project period, unless otherwise authorized by NMFS;
- 4) all sharks dead at haul back (including prohibited species) or legally retained for sale would be biologically sampled (e.g., vertebra and reproductive organs removed) and sent to the SEFSC;
- 5) hooks and sets deployed inside and outside the EFC PLL Closed Area must be equipped with hook timers, in accordance with protocols established by NMFS, to determine when animals were captured and when mortality occurs; and
- 6) SEFSC shark scientists would provide training to the researchers, vessel captains, and observers before the project begins to ensure that they understand the distinguishing features and identification methodologies for these three shark species. (We note, however, that while misidentification of sharks generally is problematic, NMFS is confident that during this project, dusky sharks could be distinguished from the other shark species by the authorized samplers because all dead sharks would be required to be brought onboard as a condition of the EFP. This would provide sufficient time for proper shark identification.)

In addition to these measures, NMFS will review data about shark interactions and mortality from the first year of research project operations and will consider additional permit terms and conditions if necessary for any subsequent authorized years.

Collections and harvests of Atlantic HMS would be authorized only when authorized samplers, including observers or vessel captains and crew, are present on authorized vessels. A copy of the EFP must be available for inspection aboard each of the authorized vessels while conducting the authorized activity. A copy of the EFP would accompany all biological samples (vertebra and reproductive organs) during transport.

Vessel operators participating in the research project would also be required to submit electronic logbooks at the end of each set. Additionally, hooks on sets inside and outside the EFC PLL Closed Area would be required to be equipped with a hook timer to determine when animals were captured and when mortality occurred (if applicable). Finally, to assist in current research efforts on shortfin mako sharks, observers would be requested to place a specified number of pop-up satellite archival tags (PSATS) on shortfin mako sharks that are released alive.

All at-sea fisheries observers would use NOAA Pelagic Observer Program protocols and forms to ensure data compatibility with current federal data collection. NMFS would review all at-sea video from the electronic monitoring system maintained by NOAA for sets conducted under this EFP.

For all participating vessels, Digital Globe, Inc. (Herndon, VA, USA; <https://www.digitalglobe.com>) has developed a custom *Insight Explorer* program within its proprietary *Sea Star* software that would establish a time/date and GPS-based geographic location tag for each event entered at sea by the vessel operator; this program is now in final testing, concurrent with the planned deployment of the system in January 2017. The vessel operator would manually enter the species for each capture event during the time of capture, which can then be linked directly to the video feed maintained by NOAA, which is itself time/date tagged. A daily summary of these manual entries would then be automatically compiled by the software and sent via satellite feed at midnight every night to both the researcher (EFP applicant) and vessel owner, which would be compiled into an electronic logbook and thus provide nearly real-time monitoring of the project catches. A copy of this daily summary would also be provided to NMFS, upon request. During the project, a randomly selected set of individual capture events would be pulled from the database, and a request for the respective video feed from that time/date tag would be made to NOAA, who would provide it with the researcher. The video would then be compared by the researcher with the electronic logbook data for the event as an auditing mechanism for the electronic logbooks.

The study would use the electronic logbook data for the purposes of spatial and catch rate analyses, while the at-sea fisheries observer data would be used for length-based analyses. The project would also provide an analysis of the accuracy of the electronic capture event system via the auditing of the NOAA video monitoring data. Audits would be conducted at three-month intervals throughout the duration of the project, and results would be used in ongoing consultations on the project with NOAA.

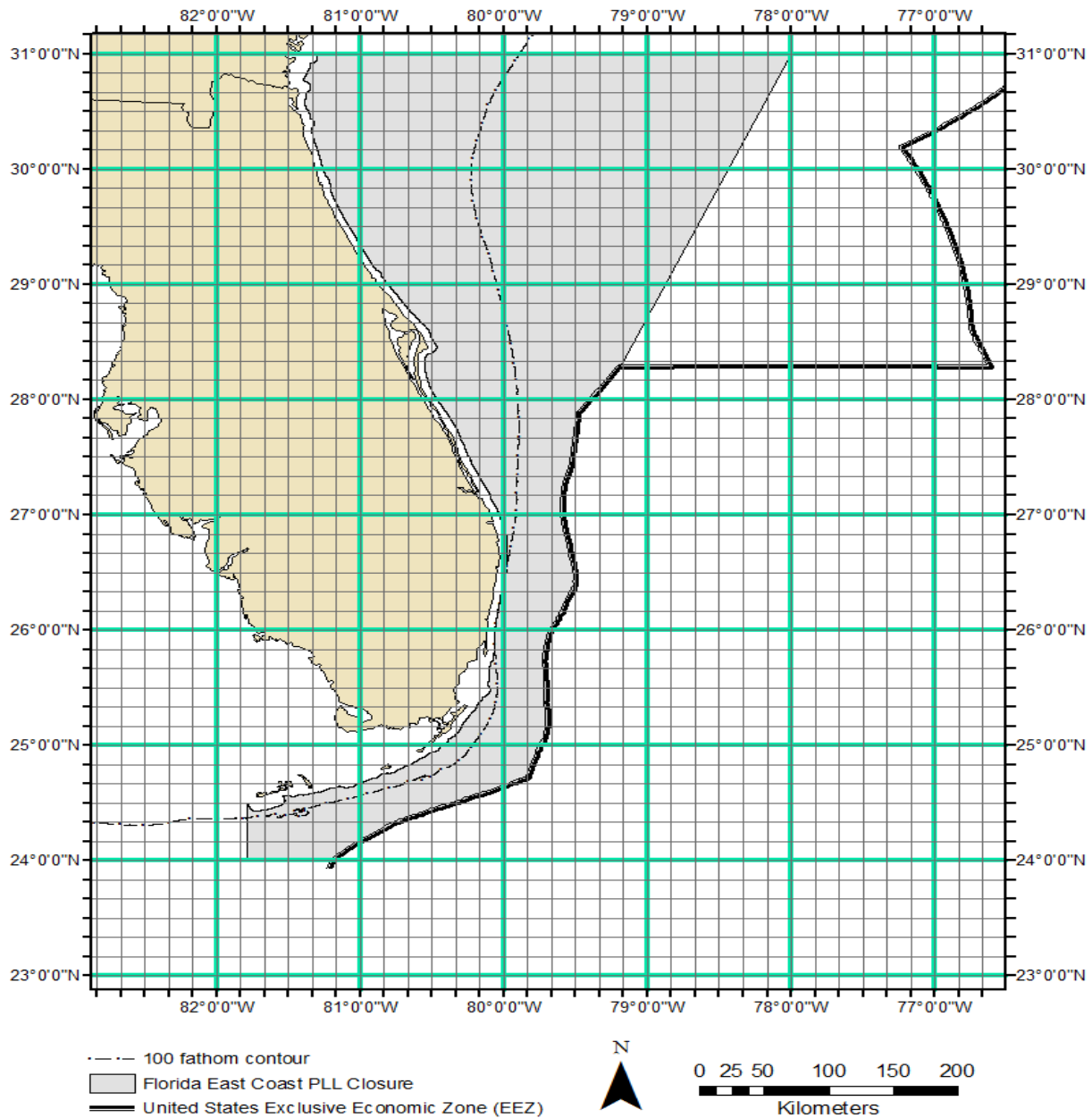


Figure 2-1 Alternative 1 No Action. East Florida Coast PLL Closed Area shown in its entirety would remain closed; No EFP would be issued.

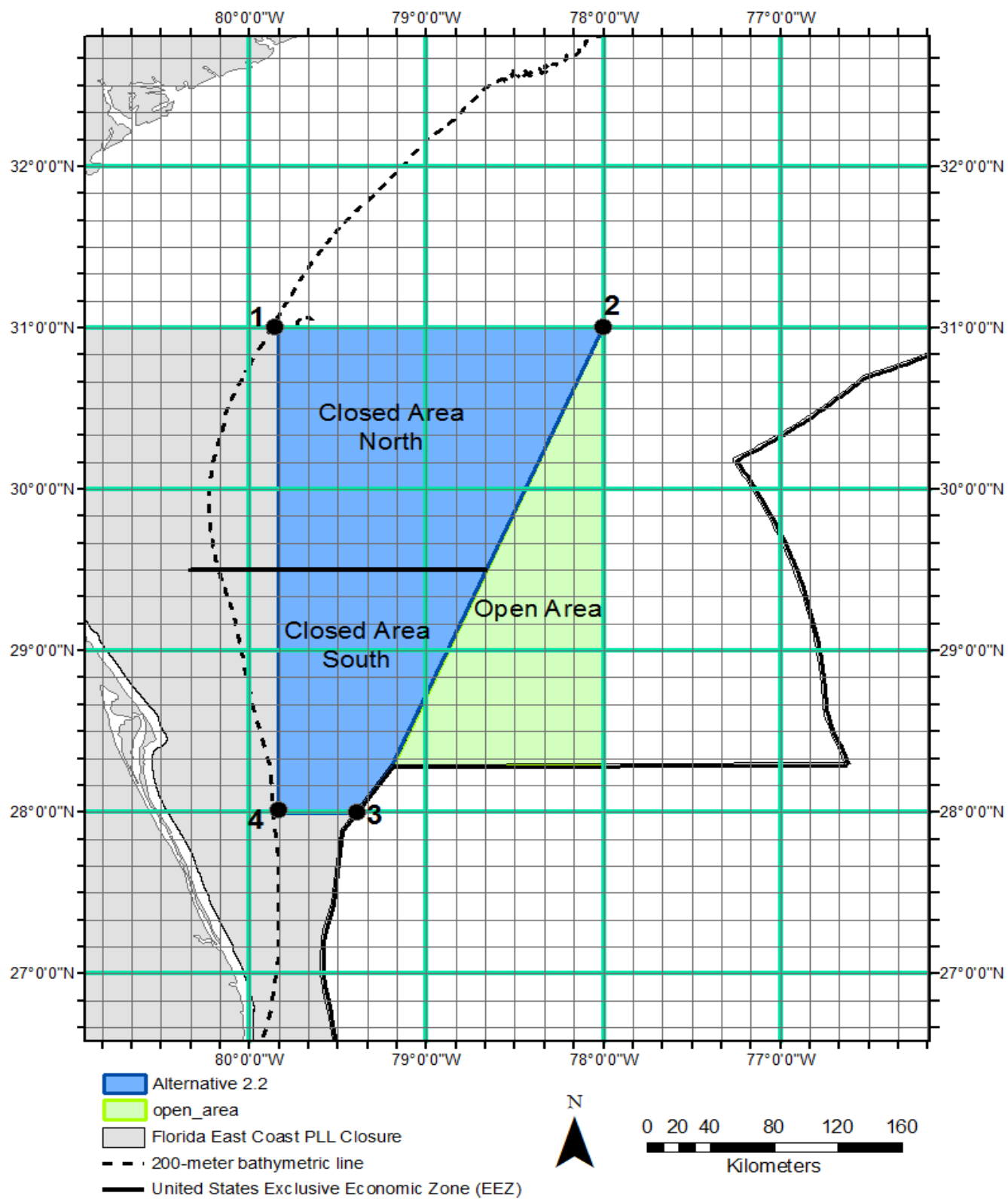


Figure 2-2 Alternative 2 Proposed area to conduct research using pelagic longline vessels. Coordinates are provided in text beginning with point number 1 and proceeding clockwise to number 4.

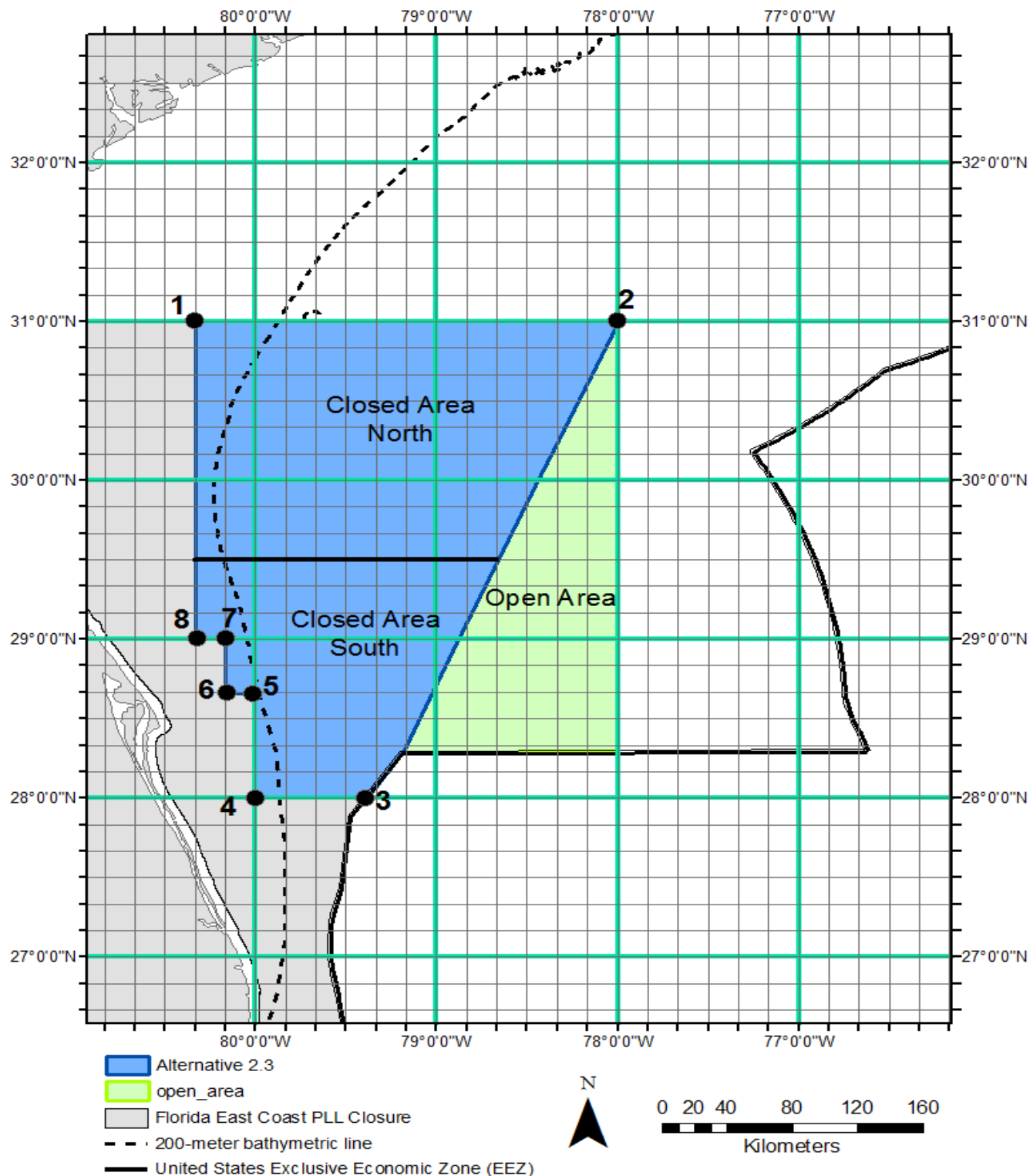


Figure 2-3 Alternative 3 Proposed area to conduct research using pelagic longline vessels (Preferred Alternative). Coordinates are provided in text beginning with point number 1 and proceeding clockwise to number 8.

Table 2.1 a and b. Coordinates of the proposed research areas shown in Figures 2.2 and 2.3 beginning with location number 1 and proceeding clockwise through location number 4 or 8 depending on the alternative.

a. Coordinates for Alternative 2 (Figure 2.2)

Point	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	31°	0'	0"	79°	50'	0"
2	31°	0'	0"	78°	0'	0"
3	28°	0'	0"	79°	23'	37"
4	28°	0'	0"	79°	50'	0"

b. Coordinates for Preferred Alternative 3 (Figure 2.3)

Point	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	31°	0'	0"	80°	20'	0"
2	31°	0'	0"	78°	0'	0"
3	28°	0'	0"	79°	23'	37"
4	28°	0'	0"	80°	0'	0"
5	28°	40'	0"	80°	0'	0"
6	28°	40'	0"	80°	10'	0"
7	29°	0'	0"	80°	10'	0"
8	29°	0'	0"	80°	20'	0"

3.0 **AFFECTED ENVIRONMENT**

3.1 **Biology and Life History**

Detailed descriptions of the life histories of HMS managed by NMFS are presented in Chapter 3 of the Final 2006 Consolidated HMS FMP (NMFS, 2006), which is incorporated by reference. The Final 2006 Consolidated HMS FMP and its amendments encompass the federal conservation and management measures for Atlantic highly migratory species. Chapter 3 (specifically at Section 3.2) and Appendix B of the 2006 Consolidated HMS FMP provide details about each of these managed species, including Atlantic Swordfish, western Atlantic bluefin tuna, Atlantic BAYS tunas (bigeye, albacore, yellowfin, and skipjack), Atlantic billfish (blue marlin, white marlin, Atlantic sailfish, and longbill spearfish), and Atlantic sharks. There are 39 federally managed Atlantic shark species, which include large coastal sharks (sandbar, silky, tiger, blacktip, bull, spinner, lemon, nurse, smooth hammerhead, scalloped hammerhead, and great hammerhead sharks), small coastal sharks (Atlantic sharpnose, blacknose, finetooth, and bonnethead sharks), pelagic sharks (shortfin mako, thresher, oceanic whitetip, porbeagle, and blue sharks), and prohibited species (whale, basking, sandtiger, bigeye sandtiger, white, dusky, night, bignose, Galapagos, Caribbean reef, narrowtooth, longfin mako, bigeye thresher, sevengill, sixgill, bigeye sixgill, Caribbean sharpnose, smalltail, and Atlantic angel sharks). For each of the species, the 2006 Consolidated HMS FMP provides details about the species' life history parameters and relevant biological metrics. That detailed information is not repeated here.

3.2 **Habitat**

Typically, the fisheries targeting swordfish and tunas exist offshore in deeper waters within the water column, so there is no interaction with bottom substrate. Highly mobile, pelagic species such as tuna, swordfish, and sharks, are widely dispersed in oceanic, neritic (waters over the continental shelf), coastal and estuarine waters, and move frequently over great horizontal distances, commonly migrating vertically within the water column.

Atlantic HMS distributions are most frequently associated with hydrographic features such as density fronts between different water masses. The scales of these features may vary. For example, the river plume of the Mississippi River extends for miles into the Gulf of Mexico and is a fairly predictable feature, depending on the season. Fronts that set up over the DeSoto Canyon in the Gulf of Mexico, or over the Charleston Bump or the Baltimore Canyon in the Mid-Atlantic, may be of a much smaller scale. The locations of many fronts or frontal features are statistically consistent within broad geographic boundaries. These locations are influenced by riverine inputs, movement of water masses, and the presence of topographic structures underlying the water column, thereby influencing habitat for Atlantic HMS.

The region of the Atlantic Ocean within which EFH for federally managed Atlantic HMS is identified spans the area between the Canadian border in the north to the Dry Tortugas in the south. The distribution of marine species along the Atlantic seaboard is strongly affected by the cold Labrador Current in the north, the warm Gulf Stream in the middle and southern portions of the region, and generally by the combination of high summer and low winter temperatures. For many species, Cape Hatteras forms a strong zoogeographic boundary between the Mid- and South Atlantic areas, while the Cape Cod/Nantucket Island area is a somewhat weaker zoogeographic boundary in the north.

High densities of fish resources are associated with particular habitat types (e.g., east Mississippi Delta area, Florida Big Bend seagrass beds, Florida Middle Grounds, mid-outer shelf, and the DeSoto Canyon area). The highest values of surface primary production are found in the upwelling area north of the Yucatan Channel and in the DeSoto Canyon region. In terms of general biological productivity, the western Gulf is considered to be more productive in the oceanic region compared to the eastern Gulf. Productivity of areas where Atlantic HMS are known to occur varies between the eastern and western Gulf, depending on the influence of the Loop Current.

Deviations in major currents can also influence the distribution of HMS in the Atlantic Ocean. The Gulf Stream produces meanders, filaments, and warm and cold core rings that significantly affect the physical oceanography of the continental shelf and slope. The Gulf Stream system is made up of the Yucatan Current that enters the Gulf of Mexico through the Yucatan Straits, the Loop Current which is the Yucatan Current after it separates from Campeche Bank and penetrates the Gulf of Mexico in a clockwise flowing loop, the Florida Current as it travels through the Straits of Florida and along the continental slope into the South Atlantic Bight, and the Antilles Current as it follows the continental slope (Bahamian Bank) northeast to Cape Hatteras. From Cape Hatteras it leaves the slope environment and flows into the deeper waters of the Atlantic Ocean. Inshore and offshore distribution of HMS following the edge of the Gulf Stream can be greatly influenced by the patterns of meanders, filaments, and eddies. The Gulf Stream and the Gulf of Mexico Loop Current are also affected by bathymetric and geophysical features (e.g., the Charleston Bump, the Straits of Florida, the Yucatan Straits) that may influence circulation patterns and direction.

Although HMS primarily occupy open ocean waters, they often utilize coastal or inshore habitats. This is especially true for several species of sharks that move inshore, often into shallow coastal waters and estuaries, to aggregate, pup, or give birth; these areas may then become nursery areas as the young develop. Areas that are known nursery or spawning grounds, or areas of Atlantic HMS aggregation for feeding or other reasons, are considered to be essential fish habitat for these species. It should be noted that characteristics of coastal and offshore habitats may be affected by activities and conditions occurring outside of those areas (further up-current) due to water flow or current patterns that may transport materials that could cause negative impacts.

In the U.S. Caribbean, high and diverse concentrations of biota are found where habitat is abundant. Coral reefs, sea grass beds, and mangrove ecosystems are the most productive of the habitat types found in the Caribbean, but other areas such as soft-bottom lagoons, algal hard grounds, mud flats, salt ponds, sandy beaches, and rocky shores are also important in overall productivity. These diverse habitats allow for a variety of floral and faunal populations. Coral reefs and other coral communities are some of the most important ecological (and economic) coastal resources in the Caribbean. Seagrass beds are highly productive ecosystems that are quite extensive in the Caribbean; some of the largest seagrass beds in the world lie beyond the shore on both sides of the Keys. Outer shelf regions may also provide important habitat for Atlantic HMS. U.S. Caribbean waters are primarily influenced by the westward flowing North Equatorial Current, the predominant hydrological driving force in the Caribbean region. It flows from east to west along the northern boundary of the Caribbean plateau and splits at the Lesser Antilles, flowing westward along the northern coasts of the islands. It is believed that no upwelling occurs in the waters of the U.S. Caribbean (except perhaps during storm events) and, since the waters are relatively stratified, they are severely nutrient-limited.

Material in this section is a summary of information on the Atlantic Ocean by Minerals Management Services (1992 and 1996); on the Gulf of Mexico by MMS (1996), Field et al. (1991), and NOAA (1997); and, on the U.S. Caribbean by Appeldoorn and Meyers (1993). For more information, see Final Amendment 1 and Draft Amendment 10 to the 2006 Consolidated Atlantic HMS Fishery Management Plan.

The Magnuson-Stevens Act requires NMFS to identify and describe Essential Fish Habitat (EFH), minimize to the extent practicable the adverse effects of fishing on essential fish habitat (EFH), and identify other actions to encourage the conservation and enhancement of EFH. Draft EFH maps for all of the Atlantic highly migratory species referenced in section 3.1 (above) are presented electronically on the internet via spatial files in Adobe (.pdf) format. The electronic maps and downloadable spatial EFH files for HMS and all federally managed species are available on the NMFS EFH Mapper at: <http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am10/index.html>. The South Atlantic Fishery Management Council provides a habitat Atlas that includes an EFH link at <http://www.safmc.net/ecosystem-management/mapping-and-gis-data>. These maps are "drafts" because an FMP Amendment is currently underway to more specifically define EFH for HMS species but is not yet finalized. In Amendment 1 to the 2006 Consolidated HMS FMP (June 12, 2009, 74 FR 288018), NMFS updated and revised existing identifications and descriptions of EFH for Atlantic HMS, designated a Habitat Area of Particular Concern (HAPC) for bluefin tuna in the Gulf of Mexico, and analyzed fishing and non-fishing impacts on EFH pursuant to Section 305(b) of the Magnuson-Stevens Act. In Amendment 3 in 2010, NMFS defined EFH for smooth dogfish; and in an interpretive rule and final action that published on September 22, 2010, NMFS defined EFH for roundscale

spearfish (*Tetrapturus georgii*). On April 3, 2014 the HMS Management Division presented the EFH 5-Year Review Plan to the HMS Advisory Panel (HMS AP) and to the public and requested new information to support the review. On July 1, 2015, NMFS announced the availability of the final EFH 5-Year Review and the Agency's intent to initiate an amendment (Draft Amendment 10) to the 2006 Consolidated Atlantic HMS FMP to revise certain Atlantic HMS EFH descriptions and designations (80 FR 37598). In reviewing literature that has become available since 2009, new data emerged for certain Atlantic HMS, which warrants revision to those species' EFH descriptions and designations. For other Atlantic HMS, new data were either unavailable or it was determined that the new data did not warrant revisions to EFH descriptions and designations. However, in Draft Amendment 10, new observer, survey, and tag/recapture data collected since 2009 were used to revise EFH geographic boundaries for all species. NMFS published Draft Amendment 10 on September 8, 2016 (81 FR 62100) and the comment period closed on December 22, 2016. The final Amendment 10 is expected to be available in the fall of 2017.

There are no HMS Habitat Areas of Particular Concern (HAPC) within the proposed PLL research project closed and open areas. Table 3.1 lists EFH for all HMS in the proposed project areas described in Alternative 2 and 3.

Table 3.1 Essential Fish Habitat in Proposed Project Area for Highly Migratory Species

Species	Spawning, Eggs, Larvae	Neonate/YOY	Juvenile	Adult	All Life Stages Combined
Swordfish	X		X	X	
Bigeye Tuna			X	X	
Albacore Tuna				X	
Yellowfin Tuna			X	X	
Skipjack Tuna			X	X	
Bluefin Tuna	X				
Blue Marlin	X		X	X	
White Marlin			X	X	
Roundscale Spearfish					X
Sailfish			X	X	
White Shark					X
Tiger Shark		X	X	X	
Spinner Shark				X	
Silky Shark					X
Shortfin Mako Shark					X
Scalloped Hammerhead Shark			X	X	
Sandbar Shark			X	X	
Sand Tiger Shark		X	X	X	
Oceanic Whitetip Shark					X
Nurse Shark			X	X	
Night Shark					X
Longfin Mako Shark					X
Longbill Spearfish			X	X	

Species	Spawning, Eggs, Larvae	Neonate/YOY	Juvenile	Adult	All Life Stages Combined
Lemon Shark			X	X	
Great Hammerhead Shark					X
Dusky Shark		X	X	X	
Common Thresher Shark					X
Bull Shark			X	X	
Blue Shark				X	
Blacktip Shark			X		
Blacknose Shark			X	X	
Bignose Shark			X	X	
Bigeye Thresher Shark					X
Atlantic Sharpnose			X	X	

3.3 Status of the Stocks

A species is considered “overfished” when the current biomass (B) is less than the minimum stock size threshold ($B < B_{MSST}$). The minimum stock size threshold (MSST) is determined based on the natural mortality of the stock and the biomass at maximum sustainable yield (B_{MSY}). Maximum sustainable yield (MSY) is the maximum long-term average yield that can be produced by a stock on a continuing basis. The biomass can be lower than B_{MSY} , and the stock not be declared overfished as long as the biomass is above B_{MSST} . If a species is declared overfished, action to rebuild the stock is required by law. A species is considered rebuilt when B is greater than B_{MSY} . It is important to note that other bodies, such as ICCAT, use different thresholds for stock status determination. For instance, the ICCAT Convention defines an overfished status as B_{year} relative to B_{MSY} while domestically an overfished status is defined as B_{year} relative to B_{MSST} .

“Overfishing may be occurring” on a species if the current fishing mortality (F) is greater than the fishing mortality at MSY (F_{MSY}) ($F > F_{MSY}$). In the case of F, the maximum fishing mortality threshold is F_{MSY} . Thus, if F exceeds F_{MSY} , the stock is experiencing overfishing. If overfishing is occurring, action to end overfishing is required by law.

A species is considered healthy when B is greater than or equal to the biomass at optimum yield (B_{OY}) and F is less than or equal to the fishing mortality at optimum yield (F_{OY}). The domestic thresholds used to calculate the domestic status of Atlantic HMS, as described in the 1999 FMP and Amendment 1 to the Billfish FMP, are:

- Maximum Fishing Mortality Threshold (MFMT) = $F_{limit} = F_{MSY}$;
- Overfishing is occurring when $F_{year} > F_{MSY}$;
- Minimum Stock Size Threshold (MSST) = $B_{limit} = (1-M)B_{MSY}$ when $M < 0.5$; $MSST = 0.5B_{MSY}$ when $M \geq 0.5$ (for billfish, the specific MSST values are: blue marlin = $0.9B_{MSY}$; white marlin = $0.85B_{MSY}$; west Atlantic sailfish = $0.75B_{MSY}$); M = natural mortality. In many cases an average M across age classes or sensitivity runs from a stock assessment model is used to calculate MSST. Domestically an overfished status is defined as B_{year} relative to B_{MSST} ;

- Biomass target during rebuilding = B_{MSY} ;
- Fishing mortality during rebuilding $< F_{MSY}$;
- Fishing mortality for healthy stocks = $0.75F_{MSY}$ (Final target = F_{OY});
- Biomass for healthy stocks = $B_{OY} \approx 1.25$ to $1.30B_{MSY}$;
- Minimum biomass flag = $(1-M)B_{OY}$; and
- Level of certainty of *at least* 50 percent but depends on species and circumstances.
- For some stocks (e.g., bluefin tuna, albacore), spawning stock biomass (SSB) is used as a proxy for biomass.
- For sharks, in some cases, spawning stock fecundity (SSF) or number of fish (N) can be used as a proxy for biomass since biomass does not influence pup production in sharks. SSF is the sum of the number of mature sharks at age multiplied by pup-production at age.

Table 3.2 and Table 3.4 present the stock assessment information and the current stock status of Atlantic HMS as of November 2016 under both the domestic and international thresholds (e.g., whether a species is considered to be overfished on a domestic, and when appropriate, international level). NMFS updates all U.S. fisheries stock statuses each quarter and provides a final Status of U.S. Fisheries Report to Congress on an annual basis (http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries).

With the exception of many Atlantic shark stocks, stock assessments for Atlantic HMS are conducted by ICCAT's SCRS (<http://www.iccat.int/en/assess.htm>). In 2016, the SCRS completed stock assessments for Atlantic yellowfin tuna, North Atlantic albacore tuna, and West Atlantic sailfish.

Atlantic shark stock assessments for large coastal, small coastal, and smoothhound sharks are generally completed through NMFS' Southeast Data, Assessment, and Review (SEDAR) process. In 2016, a stock assessment update was completed for dusky sharks following the SEDAR process.

In some cases, NMFS looks to available resources, including peer reviewed literature, for external assessments that, if deemed appropriate, could be used for domestic management purposes. NMFS followed this process in determining the stock status of scalloped hammerhead sharks based on an assessment for this species that was completed by Hayes et al. (2009).

Table 3.2 Atlantic HMS Stock Status Summaries (Domestic and International): Overfished (and Years to Rebuild) and Not Overfished

Species	Current Relative Biomass Level	B _{MSY}	International Threshold	Domestic Minimum Stock Size Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)	Most Recent Assessment
West Atlantic bluefin tuna	SSB ₂₀₁₃ /SSB _{MSY} * = 2.25 (1.92 - 2.68) (low recruitment) SSB ₂₀₁₃ /SSB _{MSY} * = 0.48 (0.35 - 0.72) (high recruitment)	SSB _{MSY} = 13,226 mt (low recruitment; 12,969-13,645 mt) SSB _{MSY} = 63,102 mt (high recruitment; 50,096-72,921 mt)	B _{MSY}	0.86 SSB _{MSY} (11,374 mt; low recruitment) (54,268 mt; high recruitment)	Low recruitment scenario: Not overfished High recruitment scenario: Overfished	Low recruitment scenario: Not overfished* High recruitment scenario: Overfished*	20	5/1/1999 (2019)	2014
Atlantic bigeye tuna	B ₂₀₁₄ /B _{MSY} = 0.67 (0.48 - 1.20)	<i>Unspecified</i> †	B _{MSY}	0.6 B _{MSY}	Overfished	Not overfished (Rebuilding)	Not available† ‡‡	1/1/1999	2015
Atlantic yellowfin tuna	B ₂₀₁₀ /B _{MSY} = 0.85 (0.61 - 1.12)	<i>Unspecified</i> †	B _{MSY}	0.5 B _{MSY} (age 2+)	Overfished	Not overfished			2011
North Atlantic albacore tuna	B ₂₀₁₅ /B _{MSY} = 1.36 (1.05-1.78)	B _{MSY} = 407,567 mt (366,309-463,685)	B _{MSY}	0.7 B _{MSY} (285,297 mt;)	Not overfished	Not overfished			2016
West Atlantic skipjack tuna	B ₂₀₁₃ /B _{MSY} : Probably close to 1.3	30,755 mt	B _{MSY}	<i>Unknown</i>	Not overfished	Not overfished			2014
North Atlantic swordfish	B ₂₀₁₁ /B _{MSY} = 1.14 (1.05 - 1.24)	65,060 mt	B _{MSY}	0.8 B _{MSY} ; (52,048 mt)	Not overfished	Not overfished			2013
South Atlantic swordfish	B ₂₀₁₁ /B _{MSY} = <i>Unknown but likely above 1</i>	<i>Unknown</i>	B _{MSY}	0.8 B _{MSY} (<i>Unknown</i>)	Not overfished	Not overfished			2013
Blue marlin	B ₂₀₀₉ /B _{MSY} = 0.67 (0.53 - 0.81)	25,411 mt (SSB _{MSY})	B _{MSY}	0.9 B _{MSY} (22,870 mt; based on SSB _{MSY})	Overfished	Overfished	Not available† ‡‡	6/1/2001	2011

Species	Current Relative Biomass Level	B _{MSY}	International Threshold	Domestic Minimum Stock Size Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)	Most Recent Assessment
White marlin (and roundscale spearfish)	B ₂₀₁₀ /B _{MSY} = 0.5 (0.42-0.60)	29,240 mt (27,260 - 30,720 mt)	B _{MSY}	0.85 B _{MSY} (23,171-26,112 mt)	Overfished	Overfished	Not available† ‡‡	6/1/2001	2012
West Atlantic sailfish	SSB ₂₀₁₄ /SSB _{MSY} = 1.81 (0.51-2.57)* SSB ₂₀₁₄ /SSB _{MSY} = 1.16 (0.18-1.69)*	1,438-1,636 t	B _{MSY}	0.75 B _{MSY}	Not Likely				2016
Longbill spearfish	Unknown	Unknown	B _{MSY}	Unknown	Unknown	Unknown			1997
Northwest Atlantic porbeagle sharks	B ₂₀₀₈ /B _{MSY} = 0.43 - 0.65	29,382 - 40,676 mt	B _{MSY}	(1-M)B _{MSY} **	Overfished	Overfished	100	7/24/2008 (2108)	2009
North Atlantic blue sharks	B ₂₀₁₃ /B _{MSY} = 1.35-3.45	Unspecified†	B _{MSY}	(1-M)B _{MSY}	Not likely overfished	Not overfished			2015
North Atlantic shortfin mako sharks	B ₂₀₁₀ /B _{MSY} = 1.15 - 2.04	183,612 mt - 863,655 mt††	B _{MSY}	(1-M)B _{MSY} **	Not overfished	Not overfished			2012
Sandbar sharks	SSF ₂₀₀₉ /SSF _{MSY} = 0.51 - 0.72	SSF _{MSY} = 349,330 - 1,377,800 (numbers of sharks)	NA	301,821 - 1,190,419 (based on SSF _{MSY})	NA	Overfished	66	1/1/2005 (2070)	2010
Gulf of Mexico blacktip sharks	SSF ₂₀₁₀ /SSF _{MSY} = 2.00-2.66	SSF _{MSY} = 1,570,000 - 6,440,000 (numbers of sharks)	NA	1,327,697 - 5,446,093 (1-M)SSF _{MSY}	NA	Not overfished			2012
Atlantic blacktip sharks	Unknown	Unknown	NA	(1-M)B _{MSY}	NA	Unknown			2005/2006
Dusky sharks	SSF ₂₀₁₅ /SSF _{MSY} = 0.41 - 0.64	Unknown†	NA	(1-M)SSB _{MSY}	NA	Overfished	100	7/24/2008 (2108)	2016
Scalloped hammerhead sharks	N ₂₀₀₅ /N _{MSY} = 0.45	N _{MSY} = 62,000 (numbers of sharks)	NA	(1-M)N _{MSY}	NA	Overfished	10	7/3/2013 (2023)	2009

Species	Current Relative Biomass Level	B _{MSY}	International Threshold	Domestic Minimum Stock Size Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)	Most Recent Assessment
Atlantic Bonnethead sharks	Unknown	Unknown	NA	Unknown	NA	Unknown			2013
Gulf of Mexico Bonnethead sharks	Unknown	Unknown	NA	Unknown	NA	Unknown			2013
Atlantic sharpnose sharks – Atlantic stock	SSF ₂₀₁₁ /SSF _{MSY} = 2.07	SSF _{MSY} = 4,860,000 (numbers of sharks)	NA	(1-M)SSF _{MSY}	NA	Not overfished			2013
Atlantic sharpnose sharks - Gulf of Mexico stock	SSF ₂₀₁₁ /SSF _{MSY} = 1.01	SSF _{MSY} = 17,900,000	NA	(1-M)SSF _{MSY}	NA	Not overfished			2013
Atlantic blacknose sharks – Atlantic stock	SSF ₂₀₀₉ /SSF _{MSY} = 0.43 – 0.64	SSF _{MSY} = 77,577 - 288,360 (numbers of sharks)	NA	62,294 - 231,553 (1-M)SSF _{MSY}	NA	Overfished	30	7/3/2013 (2043)	2010
Atlantic blacknose sharks – Gulf of Mexico stock	Unknown	Unknown	NA	(1-M)B _{MSY}	NA	Unknown			2010
Finetooth sharks	N ₂₀₀₅ /N _{MSY} = 1.80	N _{MSY} = 3,200,000 (numbers of sharks)	NA	2,400,000 (1 - M)N _{MSY}	NA	Not overfished			2007
Atlantic smooth dogfish	SSF ₂₀₁₂ /SSF _{MSY} = 1.96-2.81	SSF _{MSY} = 4,746,000	NA	3,701,000 (1 - M)SSF _{MSY}	NA	Not overfished			2015
Gulf of Mexico smoothhound shark complex	N ₂₀₁₂ /N _{MSY} = 1.68-1.83	N _{MSY} = 7,190,000	NA	5.53E+06 (1 - M)N _{MSY}	NA	Not overfished			2015

*Future stock productivity is based upon two hypotheses about future recruitment: a “high recruitment scenario” in which future recruitment has the potential to achieve levels that occurred in the early 1970s and a “low recruitment scenario” in which future recruitment is expected to remain near present levels. The SCRS, as stated in the stock assessment, has insufficient evidence to favor either scenario over the other and notes that both are plausible (but not extreme) lower and upper bounds on rebuilding potential. **M is unknown. †A value for B_{MSY} (or its proxy) was not provided in the stock assessment. ††Only the BSP model provided B_{MSY} values. The B_{MSY} range encompasses the 16 scenarios run of the BSP model. †††There is insufficient information to estimate how many years it will take this stock to rebuild. + Stock Synthesis estimate utilizing decreasing CPUE trends, estimate with approximate 95% confidence intervals. Sources: SCRS, 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016; Gibson and Campana, 2005; Cortés et al., 2006; NMFS, 2006; NMFS, 2007; Hayes et al., 2009; SEDAR 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016.

Table 3.3 Atlantic HMS Stock Status Summaries (Domestic and International): Overfishing Is Occurring and Overfishing Is Not Occurring

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status	Most Recent Assessment
West Atlantic bluefin tuna	$F_{2010-2012}/F_{MSY}^* = 0.36$ (0.28 - 0.43) (low recruitment) $F_{2010-2012}/F_{MSY}^* = 0.88$ (0.64 - 1.08) (high recruitment)	$F_{MSY} = 0.20$ (0.17-0.24) (low recruitment) $F_{MSY} = 0.08$ (0.07-0.10) (high recruitment)	Low recruitment scenario: Overfishing is not occurring* High recruitment scenario: Overfishing is not occurring*	Low recruitment scenario: Overfishing is not occurring* High recruitment scenario: Overfishing is not occurring*	2014
Atlantic bigeye tuna	$F_{2014}/F_{MSY} = 1.28$ (0.62 - 1.85)	$F_{MSY} = \uparrow$	Overfishing is occurring	Overfishing is occurring	2015
Atlantic yellowfin tuna	$F_{2010}/F_{MSY} = 0.87$ (0.68 - 1.40)	$F_{MSY} \uparrow$	Overfishing is not occurring	Overfishing is not occurring	2011
North Atlantic albacore tuna	$F_{2014}/F_{MSY} = 0.54$ (0.35 - 0.72)	$F_{MSY} = 0.097$ (0.079-0.109)	Overfishing is not occurring	Overfishing is not occurring	2016
West Atlantic skipjack tuna	F_{2013}/F_{MSY} : probably close to 0.7	$F_{MSY} = 1.02$ (0.78 - 1.25)	Overfishing is not occurring	Overfishing is not occurring	2014
North Atlantic swordfish	$F_{2011}/F_{MSY} = 0.82$ (0.73 - 0.91)	$F_{MSY} = 0.21$ (0.17 - 0.26)	Overfishing is not occurring	Overfishing is not occurring	
South Atlantic swordfish	$F_{2011}/F_{MSY} = \text{Unknown but likely above 1}$	<i>Unknown</i>	Overfishing is not occurring	Overfishing is not occurring	
Blue marlin	$F_{2009}/F_{MSY} = 1.63$ (1.11-2.16)	$F_{MSY} = 0.07$	Overfishing is occurring	Overfishing is occurring	2011
White marlin (and roundscale spearfish)	$F_{2010}/F_{MSY} = 0.99$ (0.75-1.27; low productivity) $F_{2010}/F_{MSY} = 0.72$ (0.51-0.93; high productivity)	$F_{MSY} = 0.03$ (0.027-0.035)	Overfishing is not likely occurring	Overfishing is occurring	2012
West Atlantic sailfish	$F_{2014}/F_{MSY} = 0.33$ (0.25 – 0.57)* $F_{2014}/F_{MSY} = 0.63$ (0.42 – 2.02)*	F_{MSY}	Overfishing is not likely occurring		2016
Longbill spearfish	<i>Unknown</i>	<i>Unknown</i>	<i>Unknown</i>	Unknown	1997
Northwest Atlantic porbeagle shark	$F_{2008}/F_{MSY} = 0.03 - 0.36$	0.025 - 0.075	Overfishing is not occurring	Overfishing is not occurring	2009

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status	Most Recent Assessment
North Atlantic blue shark	$F_{2013}/F_{MSY} = 0.04-0.75$	0.19-0.20	Overfishing is not likely occurring	Overfishing is not occurring	2015
North Atlantic shortfin mako shark	$F_{2010}/F_{MSY} = 0.16 - 0.92$	0.029 - 0.104††	Overfishing is not occurring	Overfishing is not occurring	2012
Sandbar	$F_{2009}/F_{MSY} = 0.29 - 2.62$	0.004 - 0.06	Not assessed internationally	Overfishing is not occurring	2010
Gulf of Mexico blacktip	$F_{2010}/F_{MSY} = 0.05 - 0.27$	0.021 - 0.163	Not assessed internationally	Overfishing is not occurring	2012
Atlantic blacktip	<i>Unknown</i>	<i>Unknown</i>	Not assessed internationally	<i>Unknown</i>	2005/2006
Dusky shark	$F_{2015}/F_{MSY} = 1.08 - 2.92$	0.015 - 0.046	Not assessed internationally	Overfishing is occurring	2016
Scalloped hammerhead shark	$F_{2009}/F_{MSY} = 1.29$	0.11	Not assessed internationally	Overfishing is occurring	2009
Bonnethead shark – Atlantic stock	<i>Unknown</i>	<i>Unknown</i>	Not assessed internationally	<i>Unknown</i>	2013
Bonnethead shark – Gulf of Mexico stock	<i>Unknown</i>	<i>Unknown</i>	Not assessed internationally	<i>Unknown</i>	2013
Atlantic sharpnose shark – Atlantic stock	$F_{2011}/F_{MSY} = 0.23$	0.184	Not assessed internationally	Overfishing is not occurring	2013
Atlantic sharpnose shark - Gulf of Mexico stock	$F_{2011}/F_{MSY} = 0.57$	0.331	Not assessed internationally	Overfishing is not occurring	2013
Atlantic blacknose shark – Atlantic stock	$F_{2009}/F_{MSY} = 3.26 - 22.53$	0.01 - 0.15	Not assessed internationally	Overfishing is occurring	2010
Atlantic blacknose shark – Gulf of Mexico stock	<i>Unknown</i>	<i>Unknown</i>	Not assessed internationally	<i>Unknown</i>	2010
Finetooth shark	$F_{2005}/F_{MSY} = 0.17$	0.03	Not assessed internationally	Overfishing is not occurring	2007
Atlantic smooth dogfish	$F_{2012}/F_{MSY} = 0.61-0.99$	0.129	Not assessed internationally	Overfishing is not occurring	2015
Gulf of Mexico smoothhound shark complex	$F_{2012}/F_{MSY} = 0.07-0.35$	0.106	Not assessed internationally	Overfishing is not occurring	2015

*Where F year refers to the geometric mean of the estimates for 2010-2012 (a proxy for recent F levels). †A value for F_{MSY} was not provided in the stock assessment. ††Both the BSP and catch-free model estimated F_{MSY} . The F_{MSY} range encompasses the lowest estimate of the 16 scenarios run of the BSP model and the highest estimate of the 10 scenarios run for the catch-free model. Sources: SCRS, 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016; Gibson and Campana, 2005; Cortés et al., 2006; NMFS, 2006; NMFS, 2007; Hayes et al., 2009; SEDAR 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016.

3.4 PLL Fishery Description and Affected Area

The 2016 SAFE Report (NMFS, 2016) provides detailed information about the operation and management of the commercial HMS PLL fishery, including international and domestic landings, management measures and permitting and reporting requirements. Several relevant sections of the SAFE Report are incorporated by reference here. Those sections include: Chapter 5 (Fishery Data); Chapter 6 (Economic Status of HMS Fisheries); and, Chapter 8 (Bycatch, Incidental Catch, and Protected Species). Some of this information is also provided in Sections 3.5, 3.6, 3.7, and 3.8, below.

The entire EFC PLL Closed Area extends along the full east coast of Florida between 31° 00' N. lat., near Jekyll Island, Georgia, and Key West, FL. The area is defined as: the Atlantic Ocean seaward of the inner boundary of the U.S. EEZ from a point intersecting the inner boundary of the U.S. EEZ at 31°00' N. lat. near Jekyll Island, Georgia, and proceeding due east to connect by straight lines the following coordinates in the order stated: 31°00' N. lat., 78°00' W. long.; 28°17' 10" N. lat., 79°11' 24" W. long.; then proceeding along the outer boundary of the EEZ to the intersection of the EEZ with 24°00' N. lat.; then proceeding due west to the following coordinates: 24°00' N. lat., 81°47' W. long.; then proceeding due north to intersect the inner boundary of the U.S. EEZ at 81°47' W. long. near Key West, Florida.

The “action area” consists of the Exclusive Economic Zone (EEZ) containing the pelagic environment in the environment in the northern portion of the EFC PLL Closed Area of the Atlantic Ocean from 28° 00” N. lat. lat. to 31° 00” N. lat., and the open area eastward of the EFC PLL Closed Area. Charts of these areas are provided in Figure 2-2 and

Figure 2-3.

3.5 Pelagic Longline Catch and Bycatch

U.S. PLL catch (including bycatch, incidental catch, and target catch) is largely related to vessel and gear characteristics, but is summarized for the whole fishery in Table 3.4. U.S. PLL landings of Atlantic swordfish and tunas for 2011 - 2015 are summarized in Table 3.5.

Table 3.4 Reported Catch of Species Caught by U.S. Atlantic Pelagic Longlines, in Number of Fish, for 2011 -2015.

Species	2011	2012	2013	2014	2015
Swordfish kept	38,721	51,544	44,556	32,908	27,730
Swordfish discarded	8,736	7,996	4,756	4,655	5,382
Blue marlin discarded	544	896	844	718	990
White marlin discarded	943	1,432	1,239	1,580	2,885
Sailfish discarded	581	795	456	445	715
Spearfish discarded	281	270	342	306	837
Bluefin tuna kept	347	392	273	379	320
Bluefin tuna discarded	765	563	266	390	210
Bigeye, albacore, yellowfin, and skipjack tunas kept	69,504	84,707	67,083	73,339	54,734
Pelagic sharks kept	3,732	2,794	3,384	3,804	2,208
Pelagic sharks discarded	43,806	23,038	28,151	38,496	45,082
Large coastal sharks kept	131	86	49	47	50
Large coastal sharks discarded	6,351	7,716	7,997	5,905	8,839
Dolphin kept	30,054	42,445	34,250	63,217	53,526
Wahoo kept	1,922	3,121	2,721	3,325	1,563
Sea turtle interactions	66	61	92	93	357
Number of Hooks(×1000)	6,035	7,679	7,306	7,125	5,856

Source: Pelagic Longline Logbook Data

Table 3.5 Reported Landings (mt ww) in the U.S. Atlantic Pelagic Longline Fishery (2006-2015).

Species	2011	2012	2013	2014	2015
Yellowfin tuna	1,458.3	2,269.6	1,544.4	1,446.5	1,046.7
Skipjack tuna	0.6	0.4	0.5	0.31	0.2
Bigeye tuna	600.2	581.4	508.9	584.3	581.6
Bluefin tuna*	241.4	295.4	190.4	221.9	86.0
Albacore tuna	240.0	261.2	255.3	308.7	229.8
Swordfish N.*	2,570.9	3,346.6	2,812.1	1,815.7	1,596.2
Swordfish S.*	0.0	0.0	0.06	0.0	0.0

* Includes landings and estimated discards from scientific observer and logbook sampling programs. Source: Pelagic Longline Logbook Data based on calendar year.

3.6 Social and Economic Aspects of HMS Fisheries

3.6.1 Ex-Vessel Prices

The average ex-vessel prices per pound dressed weight (dw) for 2008 to 2015 by species and area are summarized in Table 3.6. Prices are reported in nominal dollars. The ex-vessel price depends on a number of factors including the quality of the fish (e.g., freshness, fat content, method of storage), the weight of the fish, the supply of fish, and consumer demand.

Table 3.6 Average Ex-vessel Prices per Pound (dw) for Atlantic HMS, by Area (2008-2015)

Species	Area	2008	2009	2010	2011	2012	2013	2014	2015
Bigeye tuna	Gulf of Mexico	\$6.12	\$5.80	\$5.79	\$5.64	\$6.19	\$3.18	\$3.54	\$5.57
	S. Atlantic	4.34	4.11	4.03	4.73	4.75	5.14	5.25	5.01
	Mid-Atlantic	5.70	5.42	5.86	6.38	6.90	6.35	6.66	5.89
	N. Atlantic	5.60	5.18	4.79	5.39	5.67	5.49	5.25	4.78
Bluefin tuna	Gulf of Mexico	4.51	4.65	5.42	6.38	7.16	6.72	6.49	5.75
	S. Atlantic	13.29	14.43	8.75	7.34	8.20	7.52	8.06	7.27
	Mid-Atlantic	7.94	10.10	8.94	10.64	10.95	9.02	7.66	7.20
	N. Atlantic	8.31	7.06	8.38	10.21	11.57	8.60	7.87	6.37
Yellowfin tuna	Gulf of Mexico	3.51	3.04	3.72	3.65	3.51	3.65	3.86	4.04
	S. Atlantic	2.99	2.90	3.53	3.93	4.63	3.64	3.69	3.43
	Mid-Atlantic	3.30	2.50	3.43	3.45	4.46	4.72	4.53	4.09
	N. Atlantic	3.82	2.86	2.80	3.39	4.22	3.89	3.52	3.18
Albacore tuna	Gulf of Mexico	0.49	0.55	1.40	1.09	0.68	0.77	0.77	0.78
	S. Atlantic	1.21	1.29	1.36	1.42	1.64	2.06	1.86	1.70
	Mid-Atlantic	0.97	1.10	1.30	1.19	1.25	1.41	1.27	1.36
	N. Atlantic	2.00	1.26	1.56	1.55	1.34	1.80	1.20	1.34
Skipjack tuna	Gulf of Mexico	-	0.50	-	0.90	0.75	-	-	-
	S. Atlantic	0.95	0.95	1.13	1.25	1.10	0.80	0.75	0.68
	Mid-Atlantic	4.50	-	-	0.60	1.06	0.88	1.12	0.72
	N. Atlantic	-	-	-	-	-	0.93	-	-
Swordfish	Gulf of Mexico	2.93	2.69	3.53	4.15	3.42	3.46	3.42	2.97
	S. Atlantic	4.11	4.12	4.63	4.84	4.97	4.99	4.85	4.31
	Mid-Atlantic	3.50	3.40	4.43	4.44	4.51	4.45	4.66	3.87
	N. Atlantic	4.20	3.49	4.61	4.22	4.49	4.61	4.43	3.25
Large coastal sharks	Gulf of Mexico	0.67	0.52	0.48	0.38	0.40	0.46	0.52	0.53
	S. Atlantic	0.72	0.55	0.65	0.61	0.75	0.77	0.72	0.77
	Mid-Atlantic	0.71	0.57	0.64	0.54	0.67	0.65	0.78	0.74
	N. Atlantic	-	-	-	-	-	-	-	-
Pelagic sharks	Gulf of Mexico	1.18	1.25	1.47	1.54	1.33	1.45	1.31	1.58
	S. Atlantic	1.29	1.25	1.27	1.46	1.74	1.66	1.47	1.55
	Mid-Atlantic	1.20	1.16	1.19	1.30	1.39	1.69	1.37	1.16
	N. Atlantic	0.96	1.23	1.28	1.48	1.68	2.03	2.00	1.68
Small coastal sharks	Gulf of Mexico	0.62	0.69	0.55	0.58	0.66	0.33	0.37	0.36
	S. Atlantic	0.78	0.71	0.79	0.81	0.99	0.71	0.74	0.76
	Mid-Atlantic	0.48	0.57	0.57	0.59	0.68	0.83	0.80	0.81
	N. Atlantic	-	-	-	-	-	-	-	-
Shark fins	Gulf of Mexico	14.94	15.09	16.48	15.11	14.97	11.05	9.75	10.10
	S. Atlantic	12.73	13.15	15.35	14.91	11.00	6.04	9.57	10.04
	Mid-Atlantic	3.74	3.62	6.83	3.50	2.79	1.45	1.77	1.95
	N. Atlantic	3.00	3.67	2.40	1.60	1.86	1.90	-	0.80

Sources: HMS eDealer, Dealer weighout slips from the Southeast Fisheries Science Center (SEFSC), Northeast Fisheries Science Center (NEFSC), and bluefin tuna dealer reports from the Northeast Regional Office. Gulf of Mexico includes: TX, LA,

MS, AL, and the west coast of FL. S. Atlantic includes: east coast of FL. GA, SC, and NC dealers reporting to SEFSC. Mid-Atlantic includes: NC dealers reporting to NEFSC, VA, MD, DE, NJ, NY, and CT. N. Atlantic includes: RI, MA, NH, and ME. For bluefin tuna, all NC landings are included in Mid-Atlantic.

3.6.2 Gross Revenues

Table 3.7 summarizes the average annual revenues of Atlantic HMS fisheries based on average ex-vessel prices. The total value of commercial HMS landings in 2015 was \$38.6 million (Table 3.7). Data for Atlantic HMS landings weight is as reported per eDealer in 2013 to 2015, the U.S. National Report (NMFS, 2016a), the information used in the shark stock assessments, information given to ICCAT (Cortés pers. comm., 2015), as well as price and weight reported to the NMFS Northeast HMS Management Division by Atlantic bluefin tuna dealers. These values indicate that the estimated total annual revenue of Atlantic HMS fisheries has decreased in 2015 to \$35.9 million from \$42.3 million in 2014. From 2014 to 2015, the Atlantic tuna fishery's total revenue decreased by \$2.9 million. From 2014 to 2015, the annual revenues for the shark fisheries increased by \$174 thousand. Finally, the annual revenues for swordfish declined by \$3.7 million from 2014 to 2015 due to a decrease in landings and ex-vessel price.

Of all Atlantic HMS fisheries, swordfish brings in the highest total gross revenues (~\$10.2 million total in 2015) for any single species. If gross revenues from the swordfish fishery are averaged across the approximately 104 active PLL vessels that caught swordfish in 2015, then the average annual gross revenue from swordfish fishing is just under \$100 thousand per vessel per year. Total revenue in the swordfish fishery has steadily declined since 2012. Ex-vessel price data provided in Table 3.7 since 2008 indicates that swordfish prices have fluctuated between \$3.46 and \$4.66.

In 2015, the annual ex-vessel HMS revenue landed by all fishing gear categories was \$35.9 million. Based on eDealer and Atlantic bluefin tuna bi-weekly dealer report data, approximately 66 percent of 2015 total revenues (\$23.7 million) in the fishery were landed by PLL gear.

Table 3.7 Estimates of the Total Ex-vessel Annual Revenues of Atlantic HMS Fisheries (2008-2015)

Species		2008	2009	2010	2011	2012	2013	2014	2015
Bigeye tuna	Ex-vessel \$/lb dw	\$5.26	\$5.09	\$5.22	\$5.77	\$6.42	\$5.72	\$5.79	\$5.35
	Weight (lb dw)	736,520	774,087	799,934	1,122,619	1,039,585	851,669	1,063,914	1,129,017
	Fishery revenue	\$3,874,095	\$3,940,103	\$4,175,655	\$6,477,512	\$6,674,136	\$4,673,419	\$5,716,850	\$5,454,461
Bluefin tuna	Ex-vessel \$/lb dw	\$9.35	\$8.18	\$8.35	\$10.08	\$11.15	\$8.58	\$7.84	\$6.45
	Weight (lb dw)	720,823	899,477	1,119,937	996,661	995,583	682,533	1,002,549	1,347,920
	Fishery revenue	\$6,739,695	\$7,357,722	\$9,351,474	\$10,046,343	\$11,100,750	\$5,826,566	\$7,810,287	\$8,716,613

Yellowfin tuna	Ex- vessel \$/lb dw	\$3.22	\$2.87	\$3.52	\$3.60	\$4.16	\$3.91	\$3.96	\$3.71
	Weight (lb dw)	2,423,498	3,159,665	2,154,728	2,676,682	4,349,482	2,580,759	2,779,487	1,965,050
	Fishery revenue	\$7,803,664	\$9,068,239	\$7,584,643	\$9,636,055	\$18,093,845	\$11,214,871	\$11,833,261	\$8,494,781
Skipjack tuna	Ex- vessel \$/lb dw	\$1.01	\$0.91	\$1.13	\$1.17	\$1.06	\$0.85	\$0.98	\$0.72
	Weight (lb dw)	32,628	30,688	16,269	12,931	17,804	3,857	17,919	3,421
	Fishery revenue	\$32,950	\$28,057	\$18,451	\$15,164	\$18,949	\$3,204	\$14,478	\$2,269
Albacore tuna	Ex- vessel \$/lb dw	\$1.15	\$1.11	\$1.36	\$1.29	\$1.31	\$1.70	\$1.49	\$1.46
	Weight (lb dw)	216,759	291,187	290,827	491,133	489,800	402,400	554,428	409,210
	Fishery revenue	\$248,400	\$324,439	\$394,754	\$632,450	\$639,370	\$583,230	\$800,870	\$593,911
Total tuna	Fishery revenue	\$18,698,804	\$20,718,559	\$21,524,977	\$26,807,524	\$36,527,050	\$22,301,290	\$26,175,746	\$23,262,035
Swordfish	Ex- vessel \$/lb dw	\$3.68	\$3.46	\$4.40	\$4.50	\$4.41	\$4.66	\$4.65	\$4.07
	Weight (lb dw)	3,414,513	3,762,280	3,676,324	4,473,140	5,561,605	4,099,851	2,952,835	2,576,537
	Fishery revenue	\$12,577,768	\$13,031,079	\$16,186,878	\$20,130,595	\$24,534,334	\$19,178,743	\$13,887,650	\$10,175,662
Large coastal sharks	Ex- vessel \$/lb dw	\$0.70	\$0.54	\$0.60	\$0.53	\$0.59	\$0.64	\$0.65	\$0.66
	Weight (lb dw)	1,451,423	1,532,969	1,566,741	1,469,142	1,445,597	1,392,440	1,368,178	1,593,989
	Fishery revenue	\$1,009,138	\$828,003	\$938,044	\$779,993	\$854,916	\$683,359	\$764,162	\$885,305
Pelagic sharks	Ex- vessel \$/lb dw	\$1.21	\$1.18	\$1.23	\$1.35	\$1.43	\$1.67	\$1.48	\$1.40
	Weight (lb dw)	234,546	225,575	312,195	314,314	314,084	247,833	353,623	215,298
	Fishery revenue	\$284,113	\$266,548	\$382,527	\$425,831	\$449,759	\$384,419	\$504,860	\$323,129

Small coastal sharks	Ex-vessel \$/lb dw	\$0.69	\$0.69	\$0.69	\$0.75	\$0.87	\$0.54	\$0.56	\$0.57
	Weight (lb dw)	639,842	708,279	397,766	590,174	667,501	439,704	434,377	553,419
	Fishery revenue	\$440,108	\$488,374	\$272,590	\$441,269	\$578,126	\$275,346	\$342,887	\$410,305
Shark fins*	Ex-vessel \$/lb dw	\$12.43	\$12.45	\$14.02	\$11.90	\$8.96	\$6.08	\$7.71	\$8.46
	Weight (lb dw)	116,291	123,341	113,835	118,682	121,359	150,853	110,560	105,189
	Fishery revenue	\$1,444,918	\$1,535,469	\$1,596,472	\$1,412,129	\$1,086,979	\$738,189	\$672,200	\$839,642
Total sharks	Fishery revenue	\$3,178,277	\$3,118,394	\$3,189,633	\$3,059,222	\$2,969,779	\$2,081,313	\$2,284,109	\$2,458,381
Total HMS	Fishery revenue	\$34,454,849	\$36,868,033	\$40,901,488	\$49,997,341	\$64,031,163	\$43,561,346	\$42,347,505	\$35,896,078

* Shark fin total weight for 2008 through 2012 was estimated using 5% of all sharks landed. In 2013 and 2014, it was based on reported shark fin landings reported to eDealer. Sources: HMS eDealer Program, NMFS Northeast Commercial Fisheries Database Service; Pelagic Dealer Compliance Program; and NMFS, 2016.

3.6.3 Operating Costs and Net Revenues

NMFS collects operating cost information from commercial permit holders via logbook reporting. Each year, 20 percent of active Atlantic HMS commercial permit holders are selected to report economic information along with their Atlantic HMS logbook or Coastal Fisheries logbook submissions. In addition, NMFS also receives voluntary submissions of the trip expense and payment section of the logbook form from non-selected vessels.

The primary expenses associated with operating an Atlantic HMS permitted PLL commercial vessel include labor, fuel, bait, ice, groceries, other gear, and light sticks on swordfish trips. Unit costs are collected on some of the primary variable inputs associated with trips. The unit costs for fuel, bait, and light sticks are reported in Table 3.8. Fuel costs decreased over 31.1 percent from 2014 to 2015 while the cost per pound for bait decreased 13.5 percent from 2014 to 2015. The unit cost per light sticks has remained the same from 2012 to 2015.

Table 3.8 Pelagic Longline Vessel Median Unit Costs for Fuel, Bait, and Light Sticks (2008–2015)

Input Unit Costs (\$)	2008	2009	2010	2011	2012	2013	2014	2015
Fuel (per gallon)	3.50	2.00	2.50	3.40	3.50	3.35	3.25	2.24
Bait (per lb)	0.81	0.81	0.90	1.31	1.50	1.59	1.33	1.15
Light sticks (per stick)	0.37	0.37	0.25	0.25	0.30	0.30	0.30	0.30

Source: Pelagic Longline Logbook Data.

Table 3.9 provides the median total cost per trip for the major variable inputs associated with Atlantic HMS trips taken by PLL vessels. Fuel costs are one of the largest variable expenses. Total median PLL vessel fuel costs per trip decreased 26.6 percent from 2014 to 2015.

Table 3.9 Median Input Costs for Pelagic Longline Vessel Trips (2008–2015)

Input Costs (\$)	2008	2009	2010	2011	2012	2013	2014	2015
Fuel	3,213	2,862	2,386	2,814	2,784	2,860	2,554	1,875
Bait	1,488	1,785	1,895	3,150	3,000	3,000	2,565	2,250
Light sticks	600	592	500	633	750	750	750	700
Ice costs	476	514	430	600	675	584	660	750
Grocery expenses	765	895	780	900	900	900	900	900
Other trip costs	1,762	1,671	1,500	1,622	1,289	1,200	500	610

Source: Pelagic Longline Logbook Data.

Labor costs are also an important component of operating costs for HMS PLL vessels. Table 3.10 lists the number of crew on a typical PLL trip. The median number of crew members has been consistently three from 2008 to 2015. Most crew and captains are paid based on a lay system. According to Atlantic HMS logbook reports, owners are typically paid 50 percent of revenues. Captains receive a 25 percent share and crew in 2015 received 25 percent on average. These shares are typically paid out after costs are netted from gross revenues. Median total shared costs per trip on PLL vessels have ranged from \$6,500 to \$9,949 from 2008 to 2015.

Table 3.10 Median Labor Inputs for Pelagic Longline Vessel Trips (2008–2015)

Labor	2008	2009	2010	2011	2012	2013	2014	2015
Number of crew	3	3	3	3	3	3	3	3
Owner share (%)	45	47	50	50	50	50	50	50
Captain share (%)	20	20	23	23	25	23	25	25
Crew share (%)	20	25	25	25	28	25	25	25
Total shared costs (\$)	6,608	6,500	7,295	9,949	8,266	8,032	6,699	6,629

Source: Pelagic Longline Logbook Data.

In 2015, median reported total trip sales were \$17,883. In 2014, median reported total trip sales were \$17,898. After adjusting for operating costs, median net earnings per trip were \$9,920 in 2014. Median net earnings per trip increased to \$10,069 in 2015.

3.7 Protected Species Interactions in HMS Fisheries

This section provides background information about the interaction between protected species and Atlantic HMS fisheries, generally. Specific analysis of effects of the action on protected species is provided in Chapter 4.

A more detailed review of the three acts (Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), and Migratory Bird Treaty Act (MBTA)) affecting protected species, along with a description of the Pelagic Longline Take Reduction Team (<http://www.nmfs.noaa.gov/pr/interactions/trt/pl-trt.htm>), Take Reduction Plan, and measures to address protected species concerns, is available in Chapter 8 of the 2016 HMS SAFE Report (NMFS, 2016). The interaction of seabirds and longline fisheries are also considered under the United States “National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries” (NPOA – Seabirds). Bycatch of HMS in other fisheries is also discussed in the 2016 HMS SAFE Report (NMFS, 2016).

With regard to the PLL fishery, NMFS collects data on the disposition (released alive or dead) of bycatch species from logbooks submitted by fishermen in the PLL fishery. Observer reports also include disposition of the catch as well as information on hook location, trailing gear, and injury status of protected species interactions. These data are used to estimate post-release mortality of sea turtles and marine mammals based on guidelines for each (Angliss and DeMaster 1998, Ryder et al. 2006).

3.7.1 Interactions and the Marine Mammal Protection Act

NMFS relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. Draft stock assessment reports are typically published in January and final reports are typically published in the fall. Final 2015 stock assessment reports can be obtained on the web at: <http://www.nmfs.noaa.gov/pr/sars/region.htm>.

The following list outlines the marine mammal species that occur off the Atlantic and Gulf Coasts that are or could be of concern with respect to potential interactions with HMS fisheries.

<u>Common Name</u>	<u>Scientific Name</u>
Atlantic spotted dolphin	<i>Stenella frontalis</i>
Blue whale	<i>Balaenoptera musculus</i>
Bottlenose dolphin	<i>Tursiops truncatus</i>
Common dolphin	<i>Delphinus delphis</i>
Fin whale	<i>Balaenoptera physalus</i>
Harbor porpoise	<i>Phocoena phocoena</i>
Humpback whale	<i>Megaptera novaeangliae</i>
Killer whale	<i>Orcinus orca</i>
Long-finned pilot whale	<i>Globicephala melas</i>
Minke whale	<i>Balaenoptera acutorostrata</i>
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>
Northern right whale	<i>Eubalaena glacialis</i>
Pantropical spotted dolphin	<i>Stenella attenuata</i>
Pygmy sperm whale	<i>Kogia breviceps</i>
Risso's dolphin	<i>Grampus griseus</i>
Sei whale	<i>Balaenoptera borealis</i>
Short-beaked spinner dolphin	<i>Stenella clymene</i>
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>
Sperm whale	<i>Physeter macrocephalus</i>
Spinner dolphin	<i>Stenella longirostris</i>
Striped dolphin	<i>Stenella coeruleoalba</i>
White-sided dolphin	<i>Lagenorhynchus acutus</i>

Under MMPA requirements, NMFS produces an annual List of Fisheries (LOF) that classifies domestic commercial fisheries, by gear type, relative to their rates of incidental mortality or serious injury of marine mammals. The LOF includes three classifications:

1. Category I fisheries are those with frequent serious injury or mortality to marine mammals;
2. Category II fisheries are those with occasional serious injury or mortality; and

3. Category III fisheries are those with remote likelihood of serious injury or mortality to marine mammals.

The 2016 MMPA LOF was published on April 8, 2016 (81 FR 58427). The Atlantic Ocean, Caribbean, and Gulf of Mexico large PLL fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing)

Fishermen participating in Category I or II fisheries are required to register under the MMPA and to accommodate an observer aboard their vessels if requested. Vessel owners or operators, or fishermen, in Category I, II, or III fisheries must report all incidental mortalities and serious injuries of marine mammals during the course of commercial fishing operations to NMFS.

In 2015, the primary species of marine mammal with which the Atlantic PLL fishery interacted was short-finned pilot whales. The total estimated number of short-finned pilot whale interactions in this fishery during 2015 was 234, with a total of 203 estimated to have suffered serious injury. In contrast, there were an estimated 52 total interactions with all other marine mammals (including dolphins and other whales). There were no observed or estimated deaths of marine mammals in the PLL fishery from 2013 to 2015. (Garrison 2016, unpublished data).

3.7.2 Interactions and the Endangered Species Act

NMFS has taken several significant steps to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. As a result of increased sea turtle interactions in 2001 and 2002, NMFS reinitiated an Endangered Species Act (ESA) consultation for the PLL fishery and completed a new biological opinion on June 1, 2004. The June 2004 PLL Biological Opinion concluded that long-term continued operation of the Atlantic PLL fishery as proposed was not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles, but was likely to jeopardize the continued existence of leatherback sea turtles. The 2004 Biological Opinion included a Reasonable and Prudent Alternative (RPA) which was adopted and implemented within the PLL fishery, and an Incidental Take Statement (ITS) for 2004 – 2006 combined, and for each subsequent three-year period (NMFS, 2004). Management measures implemented as a result of the RPA include, but are not limited to, mandatory use of circle hooks with specified baits on PLL gear, mandatory possession and use of careful release gears in the fishery, and mandatory training on the proper use of careful release gears for all PLL vessel owners and operators.

On December 22, 2006, NMFS Office of Sustainable Fisheries (SF) requested reinitiation of the ESA section 7 consultation process for the HMS PLL fishery. On August 9, 2007, NMFS Office of Protected Resources (PR) determined that the basis and assumptions of the 2004 Biological Opinion remained valid, and that the expected effects on the species, the Terms and Conditions, and the 2004 ITS, were still appropriate and did not need to be revised.

On March 31, 2014, NMFS requested reinitiation of Section 7 consultation under the Endangered Species Act (ESA) on actions in the Atlantic PLL fishery. Despite sea turtle takes that were lower than specified in the 2004 ITS, leatherback mortality rates and total mortality levels had exceeded the level specified in the reasonable and prudent alternatives (RPAs) in the 2004 biological opinion. Additionally, new information has become available about leatherback and loggerhead sea turtle populations and sea turtle mortality. While the mortality rate measure will be re-evaluated during consultation, the overall

ability of the 2004 RPA to avoid jeopardy is not affected, and NMFS is continuing to comply with the terms and conditions of the 2004 RPA and RPMs pending completion of consultation. NMFS also has confirmed that there will be no irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of any reasonable and prudent alternative measures pending completion of consultation, consistent with section 7(d) of the Act.

On July 3, 2014, NMFS issued the final determination to list the Central and Southwest Atlantic Distinct Population Segment (DPS) of scalloped hammerhead shark (*Sphyrna lewini*) as threatened species pursuant to the ESA. On August 27, 2014, NMFS published a final rule to list the following 20 coral species as threatened: five in the Caribbean including Florida and the Gulf of Mexico (*Dendrogyra cylindrus*, *Orbicella annularis*, *O. faveolata*, *O. franksi*, and *Mycetophyllia ferox*); and 15 in the Indo-Pacific (*Acropora globiceps*, *A. jacquelineae*, *A. lokani*, *A. pharaonis*, *A. retusa*, *A. rudis*, *A. speciosa*, *A. tenella*, *Anacropora spinosa*, *Euphyllia paradivisia*, *Isopora crateriformis*, *Montipora australiensis*, *Pavona diffluens*, *Porites napopora*, and *Seriatopora aculeata*). Additionally, in that August 2014 rule, two species that had been previously listed as threatened (*A. cervicornis* and *A. palmata*) in the Caribbean were found to still warrant listing as threatened. In September 2014, NMFS listed as threatened five new Caribbean species of corals and maintained the threatened listing for two other Caribbean coral species (79 FR 53851, September 10, 2014).

NMFS is still operating under the terms and conditions of the 2004 PLL Biological Opinion, although it is currently undergoing reinitiation of consultation for the fishery. On October 30, 2014, NMFS determined that ongoing operation of the PLL fishery is consistent with the RPA and reasonable and prudent measures in the 2004 Biological Opinion and consistent with conservation and management measures and is not likely to jeopardize the continued existence of the hammerhead or coral species consistent with section 7(a)(2) of the ESA, or result in an irreversible or irretrievable commitment of resources consistent with section 7(d) of the ESA during this re-initiation of consultation. With regard to reinitiation of ESA Section 7 consultation on the Atlantic PLL fishery, the effects of HMS fishery interactions with the central and southwest Atlantic DPS of scalloped hammerhead shark and the seven threatened coral species will be considered in the ongoing PLL consultation. This will most effectively evaluate the effects of the PLL fishery on all listed species in the action area. NMFS may implement requirements of the new Biological Opinion for the PLL fishery in the future.

Sea turtle bycatch in the U.S. Atlantic PLL fishery has decreased significantly in the last decade. From 1999 to 2003, the PLL fleet targeting HMS interacted with an average of 772 loggerhead and 1,013 leatherback sea turtles per year, based on observed takes and total reported effort. In 2005, the fleet was estimated to have interacted with 275 loggerhead and 351 leatherback sea turtles outside of experimental fishing operations (Walsh and Garrison, 2006). These numbers have been reduced and in 2015, the U.S. Atlantic PLL fishery was estimated to have interacted with 243 loggerhead sea turtles and 299 leatherback sea turtles outside of experimental fishing operations (Garrison, unpublished data). In 2015, the majority of loggerhead sea turtle interactions occurred in the Florida East Coast (FEC), Mid-Atlantic Bight (MAB), and Northeast Coastal (NEC) logbook statistical areas. Interactions with leatherback sea turtles were highest in the Gulf of Mexico (GOM), MAB, and NEC statistical areas. The total interactions for the most recent 3-year ITS period (2010-12) were below the level established by the ITS in the 2004 biological opinion for both loggerheads and leatherbacks. NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for additional appropriate action, if any, as necessary. Loggerhead and leatherback sea turtle interactions, by statistical area, from 2010 – 2015 are presented in Table 3.11 and Table 3.12, respectively.

Table 3.11 Estimated Number of Loggerhead Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery, by Statistical Area (2011 - 2015)

Area	2011	2012	2013	2014	2015
CAR	4	0	4	3	1
GOM	0	56	20	23	1
FEC	92	157	50	83	90
SAB	9	37	14	19	18
MAB	81	71	91	56	70
NEC	103	199	139	10	52
NED	105	161	49	27	7
SAR	44	0	11	28	4
NCA	0	0	0	0	0
TUN	0	0	0	0	0
TUS	0	0	0	0	0
Total	438	681	376	259	243
Experimental fishery (2008-14)	0	0	1	2	-
Total	438	681	377	261	243

Source: NMFS 2016.

Table 3.12 Estimated Number of Leatherback Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery, by Statistical Area (2011-2015)

Area	2011	2012	2013	2014	2015
CAR	3	0	3	2	0
GOM	33	250	144	235	99
FEC	17	75	41	9	30
SAB	12	119	11	11	8
MAB	140	46	52	0	61
NEC	26	60	93	9	60
NED	8	41	11	0	24
SAR	0	3	6	2	12
NCA	0	0	0	0	0
TUN	1	2	2	0	5
TUS	0	0	0	0	0
Total	239	596	363	268	299
Experimental fishery (2005; 2008-14)	1	2	3	2	-
Total	240	598	366	270	299

Source: NMFS 2016.

Interactions with Seabirds

The National Plan of Action (NPOA)-Seabirds was released in February 2001, and calls for detailed assessments of longline fisheries, and, if a problem is found to exist within a longline fishery, for measures to reduce seabird bycatch within two years. Because interactions appear to be relatively low in Atlantic HMS fisheries, the adoption of immediate measures is unlikely.

Gannets, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic PLL vessels. These species and all other seabirds are protected under the Migratory Bird Treaty Act (MBTA). The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line. The line then sinks and the birds are subsequently drowned.

Bycatch of seabirds in the HMS PLL fishery is low. 12 seabirds have been observed killed from 2011 through 2015 (avg. = 2.4/yr.). In 2015, there were 104 active U.S. PLL vessels fishing for swordfish in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea that reportedly set approximately 5.9 million hooks. Two seabirds were observed taken, a greater shearwater and an unidentified shearwater. These seabirds were released dead. No expanded estimates of seabird bycatch or catch rates for the PLL fishery have been made due to the rarity of seabird takes.

4.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Environmental Impacts

Under Alternative 1, the no action alternative, NMFS would not issue an EFP to conduct scientific research with commercial PLL vessels in the EFC PLL Closed Area and an open area (for comparison purposes). NMFS would continue to prohibit PLL fishing in the closed area. Thus, there would be no environmental impacts within the closed area, as no fishing with PLL gear would take place. The EFP also requests that fishing take place within one open area under the same terms and conditions as in the closed area, for comparative purposes. If the permit is not granted, the vessels that would otherwise be conducting research under the EFP would instead be conducting normal PLL operations in areas outside the Closed Area, including the open area that would have been part of the research project. There would be no change in direct environmental impacts from those currently occurring in the area, as described and analyzed in other relevant environmental analyses for the ongoing fisheries (i.e., the 2006 Consolidated HMS FMP and amendments and associated environmental assessment and environmental impact statements).

NMFS closed the EFC area (and the Charleston Bump and DeSoto Canyon areas) through Regulatory Amendment 1 to the 1999 FMP (NMFS 2000) in March 2001 (65 FR 47213, August 1, 2000, and 66 FR 8903, February 5, 2001) to reduce the bycatch of undersized swordfish and other species of concern. The EFC PLL Closed Area (and other PLL closed areas) has remained in effect ever since. Not issuing an EFP to conduct research in the EFC PLL Closed Area would continue to provide positive ecological benefits in terms of limiting bycatch and bycatch mortality of some species within that area. However, the commercial vessels that would be participating in this EFP project are otherwise authorized to fish for HMS and, absent this EFP, would be conducting normal fishing operations in open areas consistent with their past practices.

In the 2006 Consolidated Atlantic HMS FMP, NMFS analyzed the anticipated versus actual effects of time/area closures on fishing effort, catch rates, and bycatch rates of both target and non-target species (See Section 4.1.2 of the Consolidated Atlantic HMS FMP). The combined effects of the individual area closures were examined by comparing the 2001- 2003 catch and discards to the averages for 1997-1999 throughout the entire U.S. Atlantic fishery. Changes in the numbers of fish caught and discarded were compared to the predicted values from Regulatory Amendment 1 to the 1999 FMP. Overall effort, expressed as the number of hooks set, declined by 15 percent between the two time periods. Declines

were noted for both numbers of fish kept and discarded for all species examined including swordfish, tunas, sharks, billfish, and sea turtles. The number of reported discards of swordfish, bluefin and bigeye tuna, pelagic sharks, dolphin, wahoo, blue and white marlin, sailfish, and spearfish all declined by more than 30 percent. The reported discards of blue and white marlin declined by about 50 percent and sailfish discards declined by almost 75 percent. The reported number of sea turtles caught and released declined by almost 28 percent.

The reported declines in swordfish kept and discarded, large coastal sharks kept and discarded, and dolphin kept were similar to the predicted values developed for Regulatory Amendment 1 to the 1999 FMP. For many species of concern (i.e., bluefin tuna, billfish, and sea turtles), the closures exceeded predictions in terms of the percent reduction in bycatch. Reported discards of bluefin tuna, pelagic sharks, all billfish (with the exception of spearfish for which no predicted change was developed in Regulatory Amendment 1), sea turtles, and total BAYS tunas kept all declined more than the predicted values.

In summary, based on the 2006 analysis, the combined results of the PLL closures have been effective at reducing the bycatch of many HMS. However, very little PLL fishing activity has been conducted in the EFC PLL Closed Area for approximately 15 years and, thus, little additional information has been available to update the results. Under Alternative 1, NMFS would not issue an EFP to conduct scientific research to determine the impact of the EFC PLL Closed Area in relation to other bycatch reduction measures that have been implemented since the closed area went into effect. Also, NMFS would not be able to assess whether environmental factors, such as changes in water temperature, baitfish availability, migratory changes, and stock abundance, have caused changes in the EFC PLL Closed Area. It is not currently known whether catch and bycatch rates of HMS inside and outside of the EFC PLL Closed Area are still significantly different. It is also unknown how current catch rates compare to historical catch rates in the area. Under Alternative 1, the No Action alternative, these important questions would remain unanswered.

Under Alternatives 2 and 3, NMFS would initially issue an EFP that would allow six vessels (with up to seven up to seven “backup” vessels) to conduct scientific research in a portion of the EFC PLL Closed Area (Figure 2-2 for Alternative 2, and

Figure 2-3 for Alternative 3). The proposed research area in the EFC PLL Closed Area for Alternatives 2 and 3 would be north of 28 degrees N. Latitude with bounding coordinates provided in Table 2.1.

For Alternatives 2 and 3, six PLL vessels would make up to 45 sets per quarter (180 total sets/vessel/year), with 2/3rds of the sets occurring inside the EFC PLL Closed Area and 1/3 of the sets occurring outside of the EFC PLL Closed Area. This equates to a maximum of 1,080 sets/year (six vessels x 180 sets/year). With six participating vessels, a maximum of 720 sets would occur annually within the EFC PLL Closed Area and 360 sets would occur outside of the area.

The research would be conducted using 16/0 or larger non-offset circle hooks because these hooks are currently approved and typically deployed by the PLL fleet in areas outside of the EFC PLL Closed Area. Thus, all vessels would deploy up to 750 non-offset 16/0 or larger circle hooks per set inside and outside of the EFC PLL Closed Area. This equates to a maximum of 810,000 hooks/year (six vessels). With six participating vessels, a maximum of 540,000 hooks would be deployed within the EFC PLL Closed Area and 270,000 hooks would be deployed outside of the area. The EFC PLL Closed Area is within the Florida East Coast statistical area. Table 4.1 shows the number of PLL sets from 2008 –

2015 within all U.S statistical areas, including the open areas of the FEC statistical area. The average annual number of sets within the open area of the FEC statistical area is 1,650 sets/year. The commercial vessels that would be participating in this EFP project are otherwise authorized to fish for HMS and, absent this EFP, would be conducting normal fishing operations in open areas consistent with their past practices. Because the vessels participating in the research project are already fishing in the open area of the FEC statistical area, it is expected that these vessels would shift some of their existing fishing effort from the open areas of the FEC to the proposed research area in the EFC PLL Closed Area. In other words, the overall level of effort in the FEC statistical area is not expected to increase under Alternatives 2 and 3.

Table 4.1 Number of PLL sets reported by area, 2008-2015 (source: PLL Logbook data)

AREA	2008	2009	2010	2011	2012	2013	2014	2015
CAR	100	43	75	24	6	59	40	35
FEC	1204	1382	1722	1826	1968	1890	1830	1376
GOM	3203	4040	1439	1990	3850	3368	3103	2149
MAB	1974	1635	1637	1681	2041	2261	2038	2036
NCA	22	0	3	12	4	7	13	15
NEC	648	546	732	774	849	589	569	590
NED	261	287	208	192	141	341	341	254
SAB	1136	1078	1274	1245	1245	1533	1461	1261
SAR	167	124	155	231	188	256	382	305
SAT	166	210	267	185	242	214	156	174
TOTAL	8521	9345	7512	8160	10534	10518	9933	8193

The EFC PLL Closed Area has been in effect since 2001 and a number of bycatch reduction and mitigation measures, including circle hook requirements, individual bluefin tuna quotas (IBQs), electronic monitoring systems (video cameras), bait restrictions, and disentanglement and release training and gear requirements, have been implemented in the PLL fishery since then. The North Atlantic swordfish stock has also fully recovered to sustainable levels since that time ($B_{2011}/B_{MSY} = 1.14$). Thus, NMFS is in need of information on current commercial catch and bycatch rates in the EFC PLL Closed Area to effectively manage the fishery. Most of the available data regarding catch and bycatch rates within the EFC PLL Closed Area was derived from pre-closure J-hook data, which has limited applicability, because J-hooks are now prohibited in the PLL fishery. Data from the Northeast Distant (NED) Experimental Area indicated that circle hooks may have higher catch rates for some species and lower catch rates for other species relative to J-hooks. Also, bycatch mortality rates for species captured using circle hooks are lower due to hooking locations (in the mouth as opposed to gut-hooked) and the effectiveness of current hook removal devices on incidentally captured species. Finally, the pre-closure data are now over 15 years old.

The most recent and best available scientific information to assess projected impacts within the EFC PLL Closed Area is obtained from the 2008 – 2010 research study that was conducted in the EFC and Charleston Bump PLL Closed Areas. However, the data from that project are not directly comparable when utilized to project environmental impacts (catch, bycatch, bycatch mortality) associated with the proposed research project because the data were derived from fishing activities deploying 18/0 non-offset circle hooks, whereas the current project proposes to deploy 16/0 non-offset circle hooks and, for most species, differences in catch and bycatch rates between 18/0 and 16/0 circle hooks on PLL gear for other species are not well known. At the same time, however, one study, for example, found a 26.5 percent

reduction in total yellowfin tuna caught on the 18/0 circle hooks compared to the 16/0 circle hooks (Watson, et. al, 2004), indicating a potentially significant difference. Also, the 2008-2010 study had a comparatively small sample size (188 sets), with most of the sets being deployed by one vessel in a relatively small geographic area. The small sample size and poor spatial distribution of PLL sets during the 2008-2010 research resulted in particularly uncertain data results for some shark species (including dusky, silky, and night sharks), for which catches in the closed area were anomalously high, and at an order of magnitude demonstrably different from that for most of the other species. The data results for those species is also largely inconsistent with the bulk of other data regarding PLL interactions with those species. Nevertheless, the 2008-2010 study yielded significant results ($p < 0.001$) for many important species, including swordfish, BAYS tunas, dolphinfish, and sailfish, and significant (but highly variable and thus uncertain) results for species including silky sharks and night sharks. For this reason, NMFS considers the results from the 2008 – 2010 research project to be the best available scientific information to determine catch per unit effort (CPUE) rates and projected catches within the EFC PLL Closed Area.

Data from sets that were conducted in the Charleston Bump Closed Area have been excluded for analytical purposes because that area is not included in the proposed research project.

To determine CPUE outside of the EFC PLL Closed Area, NMFS used Pelagic Observer Program (POP) data based on sets in the FEC statistical area from 2013-2015 in open areas. A total of 286 sets were observed in the FEC from 2013-2015 and CPUEs were calculated for most species. The CPUE value for each species analyzed is presented in Table 4.2.

Table 4.2 Catch Rate Comparison Between the FEC Statistical Area and the EFC PLL Closed Area By Species and Disposition (CPUE = interactions per 1,000 hooks)

Species	Disposition	Average CPUE in the FEC (2013 – 2015 POP data)	Average CPUE EFC PLL Closed Area (2008 – 2010 research data)
Swordfish	Kept	4.37	20.95
	Discarded Dead	0.97	4.37
	Discarded Alive	0.31	1.85
Bluefin tuna	Kept	0.07	0
	Discarded Dead	0.14	0
	Discarded Alive	0.10	0
Yellowfin Tuna	Kept	3.46	0.55
	Discarded Dead	0.12	0.10
	Discarded Alive	0.10	0
Bigeye Tuna	Kept	4.99	0.61
	Discarded Dead	0.65	0.04
	Discarded Alive	0.65	0
Albacore Tuna	Kept	3.03	0
	Discarded Dead	0.18	0
	Discarded Alive	0.04	0
Skipjack Tuna	Kept	0.01	0
	Discarded Dead	0.04	0.05
	Discarded Alive	0.01	0

Species	Disposition	Average CPUE in the FEC (2013 – 2015 POP data)	Average CPUE EFC PLL Closed Area (2008 – 2010 research data)
Blackfin Tuna	Kept	0.20	0.14
	Discarded Dead	0.30	0.10
	Discarded Alive	0.08	0
Unidentified Billfish	Kept	0.09	0
	Discarded Dead	0.25	0
	Discarded Alive	0.01	0
Blue Marlin	Kept	0	0
	Discarded Dead	0.21	0.23
	Discarded Alive	0.67	0.60
White Marlin	Kept	0	0
	Discarded Dead	0.09	0
	Discarded Alive	0.02	0.10
Sailfish	Kept	0	0
	Discarded Dead	0.09	0.88
	Discarded Alive	0.17	2.41
Roundscale Spearfish	Kept	0	0
	Discarded Dead	0.13	0
	Discarded Alive	0.02	0
Spearfish Unspecified	Kept	0	0
	Discarded Dead	0.02	0
	Discarded Alive	0	0
Dolphin	Kept	3.89	2.80
	Discarded Dead	0.19	0.06
	Discarded Alive	0.05	0
Wahoo	Kept	0.12	0.10
	Discarded Dead	0.02	0
	Discarded Alive	0	0
Escolar	Kept	1.24	0.52
	Discarded Dead	0.20	0.09
	Discarded Alive	0.18	0
Oilfish	Kept	0.01	0
	Discarded Dead	0.42	0.67
	Discarded Alive	0.34	0
Shortfin Mako	Kept	0.07	0.08
	Discarded Dead	0	0
	Discarded Alive	0.01	0
Mako	Kept	0	0
	Discarded Dead	0	0
	Discarded Alive	0.01	0.05
Longfin Mako	Kept	0	0
	Discarded Dead	0.01	0

Species	Disposition	Average CPUE in the FEC (2013 – 2015 POP data)	Average CPUE EFC PLL Closed Area (2008 – 2010 research data)
	Discarded Alive	0.01	0.06
Porbeagle	Kept	0	0
	Discarded Dead	0	0
	Discarded Alive	0	0
Oceanic Whitetip Shark	Kept	0	0
	Discarded Dead	0.02	0.14
	Discarded Alive	0.06	0.51
Tiger Shark	Kept	0	0
	Discarded Dead	0.02	0.13
	Discarded Alive	0.97	3.43
Blacktip Shark	Kept	0	0
	Discarded Dead	0.01	0
	Discarded Alive	0	0
Spinner Shark	Kept	0	0
	Discarded Dead	0	0
	Discarded Alive	0	0
Blue Shark	Kept	0	0
	Discarded Dead	0.10	0.10
	Discarded Alive	1.18	0.19
Dusky Shark	Kept	0	0
	Discarded Dead	0.01	0
	Discarded Alive	0.02	0.25
Sandbar Shark	Kept	0	0
	Discarded Dead	0	0
	Discarded Alive	0.01	0.16
Silky Shark	Kept	0	0
	Discarded Dead	0.50	3.00
	Discarded Alive	0.24	3.23
Night Shark	Kept	0	0
	Discarded Dead	0.04	1.18
	Discarded Alive	0.02	1.18
Thresher Shark	Kept	0	0
	Discarded Dead	0.05	0
	Discarded Alive	0.05	0
Common Thresher Shark	Kept	0	0
	Discarded Dead	0	0
	Discarded Alive	0	0.06
Bigeye Thresher Shark	Kept	0	0
	Discarded Dead	0.05	0.04
	Discarded Alive	0.04	0.04
Hammerhead	Kept	0	0

Species	Disposition	Average CPUE in the FEC (2013 – 2015 POP data)	Average CPUE EFC PLL Closed Area (2008 – 2010 research data)
Shark	Discarded Dead	0	0.08
	Discarded Alive	0	0.2
Scalloped Hammerhead Shark	Kept	0	0
	Discarded Dead	0.01	0.04
	Discarded Alive	0	0.06
Great Hammerhead Shark	Kept	0	0
	Discarded Dead	0.0043	0
	Discarded Alive	0.0020	0
Smooth Hammerhead Shark	Kept	0	0
	Discarded Dead	0	0
	Discarded Alive	0	0
Leatherback Turtle	Discarded Dead	0	0
	Discarded Alive	0.018	0
Loggerhead Turtle	Discarded Dead	0	0
	Discarded Alive	0.072	0

To ensure spatial stratification, closed area fishing activity under Alternatives 2 and 3 is proposed to be divided into northern and southern areas (Areas 1 and 2 in Table 4.3). Fishing activities occurring outside of the closed area are considered to be in Area 3 in Table 4.3. A maximum of 1,080 sets are proposed to be deployed annually with 2/3rds of the total sets (720 sets) occurring in the closed area and 1/3rd of the total sets (360 sets) occurring outside of the closed area. Thus, by quarter, this equates to a maximum of 90 sets/quarter/area. With 750 hooks per set, a maximum of 67,500 hooks would be deployed quarterly in each of the three areas (90 sets/quarter x 750 hooks/set = 67,500 hooks).

To determine the projected impacts on target catch, billfish, sea turtles, and sharks for both experimental and POP data, NMFS summed the total catch over three years (2008 – 2010 for experimental data in closed areas and 2013 - 2015 for POP in open areas). NMFS then calculated the average quarterly catch for each species kept, discarded alive, or discarded dead, as well as the catch per unit effort (CPUE). The quarterly CPUE for each species was then used to calculate the predicted number of each species that would potentially be kept or discarded. NMFS multiplied the CPUE by the total fishing effort proposed for each quarter (67,500 hooks) to estimate the predicted number of fish that could be caught quarterly during the course of this research project. For example, swordfish kept in the open area of the FEC can be calculated by multiplying 4.37 (CPUE rate) times 67.5 (thousand hooks/quarter) times 4 (quarters/year) to get 1,179 swordfish kept/year in the open area as shown in Table 4.3.

Table 4.3 summarizes the number of all species that could potentially be kept, discarded alive, or discarded dead based upon a combination of CPUEs derived from experimental data (2008 – 2010) for closed area fishing, and CPUEs derived from POP data (2013 – 2015) for open area fishing. The commercial vessels that would be participating in this EFP are otherwise authorized to fish for HMS and, absent this EFP, would be conducting normal fishing operations in open areas consistent with their past practices. NMFS conducted an analysis (Table 4.3) that compared projected catches if vessels were to continue fishing only in open areas (*i.e.*, all effort in open areas) versus projected catches from fishing

operations under the EFP (*i.e.*, 2/3 effort in closed area and 1/3 effort in open area). If an EFP was not issued, it is assumed that all fishing effort that otherwise would have occurred under the EFP in the EFC PLL Closed Area would still occur in the open area with the CPUE derived from POP data used for the open area. Thus, the row titled “Total (without EFP) - All effort in open area” indicates the catch from the open area multiplied by three. This is the “baseline” catch that would be projected to occur under normal fishing operations outside of the closed area. A positive value in the row labeled “Difference” indicates an increased catch (relative to the status quo) attributable to issuing the EFP and a negative value indicates a decrease (relative to the status quo). Although the geographic area encompassed by Alternative 3 is larger than the area in Alternative 2, the projected catches presented in Table 4.3 below are the same for both alternatives because the proposed level of authorized fishing effort in the EFC PLL Closed Area is the same, regardless of the alternative.

Table 4.3 Projected Catches (in numbers of fish) for Alternatives 2 and 3

Swordfish					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	11,313	2,359	1,001
3	Open	Annual	1,179	263	84
Total (with EFP approved)			12,492	2,622	1,085
Total (without EFP) - All effort in open area			3,537	789	252
Difference			8,955	1,833	833
Bluefin Tuna					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	19	37	28
Total (with EFP approved)			19	37	28
Total (without EFP) - All effort in open area			57	111	84
Difference			-38	-74	-56
Yellowfin Tuna					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	296	56	0
3	Open	Annual	934	34	28
Total (with EFP approved)			1,230	90	28
Total (without EFP) - All effort in open area			2,802	102	84
Difference			-1,572	-12	-56
Bigeye Tuna					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	331	21	0
3	Open	Annual	1,349	175	175
Total (with EFP approved)			1,680	196	175
Total (without EFP) - All effort in open area			4,047	525	525
Difference			-2,367	-329	-350
Albacore Tuna					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	52	0	0

3	Open	Annual	818	50	10
Total (with EFP approved)			870	50	10
Total (without EFP) - All effort in open area			2,454	150	30
Difference			-1,584	-100	-20
Skipjack Tuna					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	25	0
3	Open	Annual	2	10	2
Total (with EFP approved)			2	35	2
Total (without EFP) - All effort in open area			6	30	6
Difference			-4	5	-4
Blackfin Tuna					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	73	52	0
3	Open	Annual	55	81	21
Total (with EFP approved)			128	133	21
Total (without EFP) - All effort in open area			165	243	63
Difference			-37	-110	-42
Blue Marlin (no commercial retention)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	124	325
3	Open	Annual	0	56	181
Total (with EFP approved)			0	180	506
Total (without EFP) - All effort in open area			0	168	543
Difference			0	12	-37
White Marlin (no commercial retention)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	52
3	Open	Annual	0	24	5
Total (with EFP approved)			0	24	57
Total (without EFP) - All effort in open area			0	72	15
Difference			0	-48	42
Sailfish (no commercial retention)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	472	1,301
3	Open	Annual	0	24	47
Total (with EFP approved)			0	497	1,348
Total (without EFP) - All effort in open area			0	72	141
Difference			0	425	1,207
Roundscale Spearfish (no commercial retention)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	35	5

Total (with EFP approved)			0	35	5
Total (without EFP) - All effort in open area			0	105	15
Difference			0	-70	-10
Unknown Spearfish (no commercial retention)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	10	14
Total (with EFP approved)			0	10	14
Total (without EFP) - All effort in open area			0	30	42
Difference			0	-20	-28
Unidentified Billfish (no commercial retention)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	22	68
Total (with EFP approved)			0	22	68
Total (without EFP) - All effort in open area			0	66	204
Difference			0	-44	-136
Dusky Shark (prohibited)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	135
3	Open	Annual	0	3	5
Total (with EFP approved)			0	3	140
Total (without EFP) - All effort in open area			0	9	15
Difference			0	-6	125
Silky Shark (prohibited by PLL vessels)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	1,618	1,742
3	Open	Annual	0	136	66
Total (with EFP approved)			0	1,754	1,808
Total (without EFP) - All effort in open area			0	408	198
Difference			0	1,346	1,610
Night Shark (prohibited)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	639	638
3	Open	Annual	0	10	5
Total (with EFP approved)			0	649	643
Total (without EFP) - All effort in open area			0	30	15
Difference			0	619	628
Shortfin Mako					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	45	0	0
3	Open	Annual	18	1	3
Total (with EFP approved)			63	1	3

Total (without EFP) - All effort in open area			54	3	9
Difference			9	-2	-6
Mako					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	25
3	Open	Annual	0	0	4
Total (with EFP approved)			0	0	29
Total (without EFP) - All effort in open area			0	0	12
Difference			0	0	17
Longfin Mako (prohibited)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	31
3	Open	Annual	0	3	3
Total (with EFP approved)			0	3	34
Total (without EFP) - All effort in open area			0	9	9
Difference			0	-6	25
Porbeagle					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	0	0
Total (with EFP approved)			0	0	0
Total (without EFP) - All effort in open area			0	0	0
Difference			0	0	0
Oceanic Whitetip Shark (prohibited by PLL vessels)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	76	275
3	Open	Annual	0	21	56
Total (with EFP approved)			0	97	331
Total (without EFP) - All effort in open area			0	63	168
Difference			0	34	163
Tiger Shark					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	73	1,851
3	Open	Annual	0	7	261
Total (with EFP approved)			0	80	2,112
Total (without EFP) - All effort in open area			0	21	783
Difference			0	59	1,329
Blacktip Shark					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	2	1
Total (with EFP approved)			0	2	1
Total (without EFP) - All effort in open area			0	6	3

Difference			0	-4	-2
Spinner Shark					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	0	0
Total (with EFP approved)			0	0	0
Total (without EFP) - All effort in open area			0	0	0
Difference			0	0	0
Blue Shark					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	52	105
3	Open	Annual	1	28	319
Total (with EFP approved)			1	80	424
Total (without EFP) - All effort in open area			3	84	957
Difference			-2	-4	-533
Sandbar Shark (no retention)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	84
3	Open	Annual	0	1	2
Total (with EFP approved)			0	1	86
Total (without EFP) - All effort in open area			0	3	6
Difference			0	-2	80
Thresher Shark					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	13	15
Total (with EFP approved)			0	13	15
Total (without EFP) - All effort in open area			0	39	45
Difference			0	-26	-30
Common Thresher Shark					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	31
3	Open	Annual	0	1	0
Total (with EFP approved)			0	1	31
Total (without EFP) - All effort in open area			0	3	0
Difference			0	-2	31
Bigeye Thresher Shark (prohibited)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	20	21
3	Open	Annual	0	12	11
Total (with EFP approved)			0	32	32
Total (without EFP) - All effort in open area			0	36	33
Difference			0	-4	-1

Hammerhead Shark (prohibited by PLL vessels)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	42	108
3	Open	Annual	0	0	0
Total (with EFP approved)			0	42	108
Total (without EFP) - All effort in open area			0	0	0
Difference			0	42	108
Scalloped Hammerhead Shark (prohibited by PLL vessels)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	21	31
3	Open	Annual	0	3	0
Total (with EFP approved)			0	24	31
Total (without EFP) - All effort in open area			0	9	0
Difference			0	15	31
Great Hammerhead Shark (prohibited by PLL vessels)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	1	1
Total (with EFP approved)			0	1	1
Total (without EFP) - All effort in open area			0	3	3
Difference			0	-2	-2
Smooth Hammerhead Shark (prohibited by PLL vessels)					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	0	0	0
3	Open	Annual	0	0	0
Total (with EFP approved)			0	0	0
Total (without EFP) - All effort in open area			0	0	0
Difference			0	0	0
Dolphin					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	1,509	31	0
3	Open	Annual	1,049	50	12
Total (with EFP approved)			2,558	81	12
Total (without EFP) - All effort in open area			3,147	150	36
Difference			-589	-69	-24
Wahoo					
Area	Status		Kept	Dead	Discarded Alive
1&2	Closed	Annual	52	0	0
3	Open	Annual	32	5	1
Total (with EFP approved)			84	5	1
Total (without EFP) - All effort in open area			96	15	3
Difference			-12	-10	-2
Escolar					

Area	Status		Kept	Dead	Discarded Alive	
1&2	Closed	Annual	282	50	0	
3	Open	Annual	334	55	48	
Total (with EFP approved)			616	105	48	
Total (without EFP) - All effort in open area			1,002	165	144	
Difference			-386	-60	-96	
Oilfish						
Area	Status		Kept	Dead	Discarded Alive	
1&2	Closed	Annual	0	362	0	
3	Open	Annual	4	114	91	
Total (with EFP approved)			4	476	91	
Total (without EFP) - All effort in open area			12	342	273	
Difference			-8	134	-182	
Leatherback Turtle						
Area	Status		Dead	Alive	Lost	
1&2	Closed	Annual	0	0	31	
3	Open	Annual	0	5	1	
Total (with EFP approved)			0	5	32	
Total (without EFP) - All effort in open area			0	15	3	
Difference			0	-10	29	
Loggerhead Turtle						
Area	Status		Dead	Alive	Killed	Lost
1&2	Closed	Annual	0	0	0	0
3	Open	Annual	0	20	0	1
Total (with EFP approved)			0	20	0	1
Total (without EFP) - All effort in open area			0	60	0	3
Difference			0	-40	0	-2

Source: POP data (2013 - 2015) and Kerstetter (2008 – 2010).

Under Alternatives 2 and 3, overall swordfish catches would increase relative to otherwise authorized routine fishing operations in the open area. The proposed research project could potentially result in a total of 12,492 swordfish kept, 2,622 swordfish discarded dead, and 1,085 swordfish discarded alive. There would be an increase, attributable to the research project, of 8,954 swordfish kept, 1,833 swordfish discarded dead, and 833 discarded alive. If it is assumed that most discarded swordfish are undersized, then the discard rate for undersized swordfish is higher in the closed areas as compared to the open area of the FEC (see Table 4.2). The overall increase in undersized swordfish dead discards could be as high as 1,883 per year (and 833 discarded alive) if the maximum amount of effort authorized by this EFP is fished (See Table 4.3). However, based on historical fishing rates for the vessels that would be authorized by this EFP, NMFS estimates that it would be more likely that 977 undersized swordfish would be discarded dead and 444 would be discarded alive (see Table 4.4 below).

Catches of all tunas, except skipjack, are projected to decrease relative to otherwise authorized routine fishing operations in the open area” as a result of the proposed research. It is projected that 38, 74, and 55 fewer bluefin tuna would be kept, discarded dead, and discarded alive, respectively, under the

proposed research project. The largest projected difference would occur for bigeye tuna where there would be a decrease, attributable to the research project, of 2,366 kept, 329 discarded dead, and 349 discarded alive. Any retention of bluefin tuna would be subject to applicable individual bluefin quotas (IBQs), seasons, and retention limits at the time of the research project.

Bycatch of all billfish, except sailfish, is projected to decrease relative to otherwise authorized routine fishing operations in the open area as a result of the proposed research project. There is no commercial retention allowed for Atlantic billfish, so all catches would be discarded. It is projected that 48 fewer white marlin would be discarded dead, and 42 more would be discarded alive under the proposed research project. Similarly, the projection indicates that 69 fewer roundscale spearfish would be discarded dead, and 10 fewer would be discarded alive under the proposed research project. There is a projected increase, attributable to the research project, of 424 sailfish discarded dead, and 1,208 sailfish discarded alive. There is also a projected increase, attributable to the research project, of 12 blue marlin discarded dead, and a decrease of 38 blue marlin discarded alive.

Catches of both dolphin and wahoo are projected to decrease relative to otherwise authorized routine fishing operations in the open area as a result of the research project. It is projected that 590, 69, and 24 fewer dolphin would be kept, discarded dead, and discarded alive, respectively, under the proposed research project. The decrease in the catch of wahoo is minimal. It is projected that 12, 9, and 2 fewer wahoo would be kept, discarded dead, and discarded alive, respectively.

Under existing regulations, many highly migratory Atlantic shark species are either in the prohibited complex or otherwise cannot be retained by PLL vessels. Any commercial retention of sharks by the vessels operating under this EFP would be subject to the quotas, seasons, retention limits, and other shark conservation and management measures applicable to the PLL fishery when the research occurs.

Under the proposed research project, no large coastal sharks (LCS) are predicted to be kept, and 9 pelagic sharks (shortfin mako) would be kept. There are no data available for small coastal sharks (SCS) in the closed area from the 2008-2010 study since no SCS were caught and thus there is no specific basis for approximation within the closed area. In the absence of such data we would initially presume catch similar to that outside the closed area, where catch with PLL gear does not result in any appreciable SCS interactions, and re-evaluate the effects based on results from the first year of research activity.

No catches (kept or discarded) are projected for the following shark species: porbeagle; spinner; and, smooth hammerhead.

Discards (both dead and alive) are projected to decrease as a result of the research project for the following shark species: shortfin mako; blacktip; blue; bigeye thresher; and, great hammerhead.

Discards (both dead and alive) are projected to increase as a result of the research project for the following shark species: oceanic whitetip; tiger; silky; night; and, scalloped hammerhead.

Dead discards are projected to decrease and live discards are projected to increase as a result of the research project for the following shark species: longfin mako; dusky; and, sandbar.

Based on the 2008-2010 research data, the largest number of projected total shark discards (combined both dead and alive), relative to otherwise authorized routine fishing operations in the open area, would be: silky (2,958); tiger (1,388); night (1,247); oceanic whitetip (196); dusky (120); sandbar (78); scalloped hammerhead (46); common thresher (29); and longfin mako (20). All of these shark species would be subject to the quotas, seasons, retention limits, and other shark conservation and management measures applicable to the PLL fishery when the research occurs. No tiger sharks are projected to be kept, and any tiger shark dead discards (59 projected) would be subject to the LCS quota. PLL vessels are prohibited from retaining oceanic whitetip sharks. Any dead discards of oceanic whitetip sharks (34 projected) would be subject to the pelagic shark quota. Sandbar sharks may not be retained, and dead discards are projected to decrease under the research project relative to otherwise authorized routine fishing operations in the open area. Dead discards of common thresher sharks are also projected to decrease under the research project. Any retention or dead discards of common thresher sharks would be subject to the pelagic shark quota. PLL vessels are prohibited from retaining scalloped hammerhead sharks. Any scalloped hammerhead shark dead discards (15 projected) would be subject to the LCS shark quota. Longfin mako sharks are a prohibited species. Dead discards of longfin mako sharks are projected to decrease under the research project relative to otherwise authorized routine fishing operations in the open area. Those dead discards are not expected to occur at levels beyond a small level of bycatch and would not lead to overfishing of the complex.

A reduction in interactions with loggerhead and leatherback sea turtles captured alive is projected to occur in conjunction with the proposed research. However, an increase in the number of “lost” sea turtles could occur. A “lost” sea turtle is defined as a turtle that gets off the hook before it can be released, but was positively identified. Sea turtles that are released alive or lost are counted against the incidental take statement (ITS) that was established in the 2004 PLL Biological Opinion (BiOp). Sea turtle interactions (all species) have remained well below the ITS established in the 2004 PLL BiOp since implementation of the Reasonable and Prudent Alternatives (RPA) in 2004. Therefore, if there are additional interactions as a result of this proposed research, NMFS does not anticipate that the ITS level of interactions will be exceeded.

In summary, the largest change in kept species would be for swordfish under the proposed EFP. Under the maximum authorized level of effort or “maximum difference” scenario, authorized EFP vessels are estimated to increase their swordfish landings by 8,954 individuals, if it is assumed that authorized EFP vessels would fish the maximum amount of effort authorized under this EFP (*i.e.*, 1,080 sets with 750 hooks per set). However, it is more likely that the commercial vessels authorized under this EFP would fish similarly (*i.e.*, same number of sets and hooks) to their past fishing practices in the PLL fishery (*i.e.*, the “likely expected difference” scenario). From 2014 to 2015, the vessels proposed to participate in the EFP research project fished a median of 120 sets per year with 600 hooks per set based on logbook records. The likely expected difference scenario in Table 4.4 represents a more realistic portrayal of projected catches because it is based on historical fishing rates that factor in weather and vessel maintenance. The likely expected difference scenario estimates that authorized EFP vessels would actually fish 720 sets (120 sets multiplied by 6 vessels) with 600 hooks per set. At this level of effort, NMFS estimates 4,776 swordfish would be retained (720 sets) as compared to 8,954 swordfish under the maximum difference scenario (1,080 sets). Dead swordfish discards would be 977, as compared to the 1,833 under the maximum difference scenario. Dusky shark live discards would increase by 67 per year under the likely expected difference scenario vs. 126 under the maximum difference scenario.

Table 4.4 Summary of the difference in number of species impacted if the EFP is approved under a maximum fishing effort authorized scenario and likely expected effort scenario.

Species	Maximum Difference with EFP Approved ¹ (# of fish)			Likely Expected Difference with EFP Approved ² (# of fish)		
	Kept	Dead	Discarded Alive	Kept	Dead	Discarded Alive
Swordfish	8,954	1,833	833	4,776	977	444
Bluefin Tuna	-38	-74	-55	-20	-39	-29
Yellowfin Tuna	-1,572	-11	-56	-838	-6	-30
Bigeye Tuna	-2,366	-329	-349	-1,262	-175	-186
Albacore Tuna	-1,583	-99	-20	-844	-53	-11
Unidentified Billfish (no commercial retention)	0	-45	-135	0	-24	-72
Blue Marlin (no commercial retention)	0	12	-38	0	6	-20
White Marlin (no commercial retention)	0	-48	42	0	-26	23
Sailfish (no commercial retention)	0	424	1,208	0	226	644
Spearfish (no commercial retention)	0	-90	-38	0	-48	-20
Dolphin	-590	-69	-24	-315	-37	-13
Mako Shark	9	-1	12	5	-1	6
Oceanic Whitetip Shark (prohibited by PLL vessels)	0	33	163	0	18	87
Dusky Shark (prohibited)	0	-7	126	0	-4	67
Sandbar Shark (no retention)	0	-2	80	0	-1	43
Silky Shark (prohibited by PLL vessels)	0	1,347	1,611	0	718	859
Night Shark (prohibited)	0	619	628	0	330	335
Hammerhead Shark (prohibited by PLL vessels)	0	55	138	0	29	74
Leatherback Turtle	0	0	-10	0	0	-5
Loggerhead Turtle	0	0	-39	0	0	-21

1. The maximum difference scenario is based on the maximum total of 1,080 sets per year with a maximum of 750 hooks per set as stated in the EFP application.

2. The expected likely difference scenario is based on six vessels setting 120 sets per vessel annually with 600 hooks per set. The numbers are based on the median 2014 to 2015 logbook values for the vessels submitted to be used in this EFP

The prior research project in the EFC PLL Closed Area from 2008 – 2010 found no interactions with marine mammals. Similarly, only five observed interactions occurred in the open area of the FEC statistical area from 2013 - 2015 based upon observer data (2015: one pilot whale; 2014: one pan-tropical spotted dolphin; 2013: one unidentified marine mammal; one unidentified beaked whale, one Minke whale). With such low interaction rates and the small study size/number of vessels, an extrapolation would result in less than one marine mammal interaction, given the level of effort proposed in the research study. Therefore, the anticipated impact on marine mammals would be minimal.

Projected catches for this EFP were determined by multiplying historical catch rates (or catch per unit effort) by the proposed or anticipated levels of fishing effort. Thus, while Preferred Alternative 3 incorporates a larger geographic area, Alternative 2 and Preferred Alternative 3 would have the same comparative ecological impacts because the same amount of fishing effort would be authorized under each alternative. These alternatives would allow for a fishery research project to collect much needed

information from the EFC PLL Closed Area on catch rates, bycatch rates, discard rates, interaction rates with protected species, size of target species, hooking location, mortality at haul back, and evaluation of the condition of fish at haul back to allow post-release mortality estimates. Only a very limited amount of research has been conducted in the EFC PLL Closed Area since 2001, and there is much uncertainty associated with the catch estimates that are based upon such limited research. Additional sound scientific fishery data are needed. This new information would be compared with similar information collected from open areas to determine if there are statistically significant differences between the areas. Additionally, the project could potentially provide useful fishery management information regarding real-time electronic logbook reporting, enhanced electronic video monitoring, and improved, much needed biological information and fishery interaction information on shark species.

Alternative 3 is preferred because it would allow for the research to be conducted in a slightly larger geographic area than Alternative 2 and thus provides greater flexibility in determining set locations while adhering to an appropriate research design. Alternative 3 also fully includes the 100 fathom bathymetric contour, which is easily identifiable on depth finders or bathymetric sounders.

The overall ecological impact of Preferred Alternative 3 is expected to be minor for most species because catches (fish that are kept or discarded dead) are projected to either decline or remain the same. Although swordfish catches are projected to increase, that increase would remain well within the 2017 adjusted U.S. North Atlantic swordfish quota which is expected to be 3,359.4 mt (equivalent to the 2016 adjusted quota). Sailfish catch is also projected to increase, but the ecological impact is expected to be negligible. NMFS expects that the use of electronic logbooks, 100 percent video monitoring, and increased observer coverage (33 percent) would enable the Principal Investigator and NMFS to coordinate an appropriate response (*i.e.*, seasonal restrictions), if bycatch levels of sailfish or other species are greater than projected. A 2016 stock assessment conducted by ICCAT's Standing Committee on Research and Statistics (SCRS) found that West Atlantic sailfish were not likely to be overfished and that overfishing was not likely occurring. The amount of sailfish catch projected for this research project (226 – 424 sailfish) is not expected to lead to overfishing or have negative effects on the stock, as the overall Total Allowable Catch (TAC) recommended by ICCAT (Rec. 16-11) for this stock is 1,030 mt.

Effects on Silky, Dusky, and Night Sharks and Proposed Mitigating Measures through Permit Conditions

The analysis for Preferred Alternative 3 (as for Alternative 2) seems to indicate that fishing operations under the EFP could result in higher interactions with silky, dusky, and night sharks, compared to normal PLL vessel operations that would otherwise occur in the open area (See Tables 4.2, 4.3, and 4.4). For silky sharks, dead discards could increase by 1,347 under the maximum difference scenario or by 718 under the likely expected difference scenario; interactions could increase by 1,611 under the maximum difference scenario or by 859 under the likely expected difference scenario. For night sharks, dead discards could increase by 619 under the maximum difference scenario or by 330 under the likely expected difference scenario; interactions could increase by 628 under the maximum difference scenario or by 335 under the likely expected difference scenario. For dusky sharks, dead discards could decrease by 7 under the maximum difference scenario or by 4 under the likely expected difference scenario; interactions could increase by 126 under the maximum difference scenario or by 67 under the likely expected difference scenario. As explained below, NMFS does not believe that these increases in interactions will occur, and in any event, does not anticipate negative impacts on these shark species as a result of the EFP. NMFS anticipates long-term benefits from the valuable data that could be gathered

from shark species as a result of the research project, as the lack of data for many species can hinder effective management.

As previously noted, the data from past research in the EFC PLL Closed Area is based on a similar EFP that was carried out from 2008-2010, and that data suggested that more research was needed due to the small sample size and poor spatial distribution of PLL sets during the 2008-2010 research (Kerstetter, 2011). This is particularly true for the research's data on some shark species (including dusky, silky, and night sharks), for which catches in the closed area were anomalously high and at an order of magnitude demonstrably different from that for most other species. Additionally, estimates based on the 2008-2010 data are very high as compared to data on observed prohibited shark mortalities from the pelagic observer program between 2008-2015. See Draft Amendment 5b at pages 13-14, Tables 1.3 and 1.4. Interactions with prohibited sharks, such as dusky sharks, tend to be rare events across the entire PLL fishery. See *id.* at page 22. The 2008-2010 research's highly variable data for some shark species, in part, led to statistically significant differences in catch rates for those species between the closed area and surrounding areas. Therefore, the projected catch estimates of shark interactions and mortality based on data from the research project are uncertain and unlikely to occur.

The harvest and retention of silky sharks is prohibited by fishermen using PLL gear due to an ICCAT recommendation (11-08). Domestically, the species is managed in the Large Coastal Shark (LCS) complex. Even based on estimates from the 2008-2010 data, silky shark catch under this research project would be small compared to the overall LCS Complex commercial quota, and any silky shark mortality would count against that quota. Therefore, negative impacts on the stock are not anticipated.

A 2008 review of the U.S. night shark population found that this species has not suffered large magnitudes in decline and that PLL observer data support relatively stable trends in abundance and average size. This 2008 study noted that, compared to other sharks, the night shark has moderate rebound potential and its life history characteristics are similar to that of the silky shark. According to available analyses, night sharks are not experiencing overfishing (Carlson et al. 2008). Even based on estimates from the 2008-2010 data, NMFS does not believe that overfishing or other negative impacts on the stock would occur.

A 2016 stock assessment update recently concluded that dusky sharks are overfished and that mortality reduction of 35 percent is necessary. NMFS has undertaken an FMP amendment (Amendment 5b) to adopt conservation and management measures to end overfishing and amend the rebuilding plan for the stock. That rulemaking is currently underway, with the proposed rule published on October 16, 2016 (81 FR 71672) and the comment period ended on December 22, 2016. The Final Rule for Amendment 5b must be issued by March 2017 under the terms of a settlement agreement related to the rulemaking, and the associated management measures that will achieve reductions in mortality across the HMS fisheries will be in place soon after. The ACL for sharks in the prohibited shark species complex, including dusky sharks, has been zero, and Draft Amendment 5b would continue to retain that approach, clarifying why a small amount of bycatch will not lead to overfishing. Even based on estimates from the 2008-2010 data, NMFS does not anticipate negative impacts on the stock, as the estimates project a reduction in dead discards.

Given the uncertainty in the data and the issues related to these shark stocks, as well as the value of additional data on these shark species, NMFS has identified certain conditions in consultation with shark

scientists from both the Northeast (NEFSC) and Southeast Fisheries Science Centers (SEFSC), to appropriately limit interactions and mortality and to ensure that sharks are properly identified. These conditions would mitigate the potential effects of the research activity on these stocks, although as explained above, interactions based on the 2008-2010 data are not expected to occur. Specifically, to limit potential interactions, NMFS is proposing to limit vessel activity by reducing soak time to ten hours when (and if) three dead dusky sharks are discarded dead by a vessel participating in research activities, since reducing soak time is expected to reduce dusky shark mortality on PLL gear as it is known to on bottom longline gear (Morgan & Burgess, 2007 and Morgan, et.al., 2009). If three additional dusky sharks are discarded dead, then that vessel could not make a trip inside the EFC PLL Closed Area for the remainder of the 12-month project period, unless otherwise authorized by NMFS. Other conditions such as shark photographs, fin clips, and biological samples will help to ensure that all shark species are being properly identified. The hook timers will assist in refining appropriate PLL soak times to minimize shark mortality when reviewing this or other EFP applications in future years or if additional measures are needed in the first year.

Under reporting requirements at 50 CFR § 635.5 and 635.9, NMFS monitors all sources of mortality associated with the PLL fishery. All species caught under the authority of this EFP would be reported in the HMS logbook. Additionally, vessel operators participating in this research project would be required to submit electronic logbooks at the end of each set to NOVA Southeastern University; these data would be available to NMFS upon request. During the proposed project period, 33 percent of all sets would be observed by NMFS-trained NOVA Southeastern University students or NMFS-approved observers. Finally, NMFS would review one hundred percent of electronic video monitoring data for all sets conducted under this EFP. Species caught and commercially sold would be accounted for under the appropriate quota for that species. All participating vessels would be required to possess sufficient IBQ before departing port, and any retention of bluefin tuna would be subject to the applicable IBQ, fishing seasons, and retention limits at the time of the research project.

Social and Economic Impacts

Table 4.5 shows the number and percentage of commercial swordfish directed and incidental permit holders by state. These are the only permit holders that could potentially fish with PLL gear (if they also possess a shark limited access, an Atlantic Tunas Longline category permit, and IBQ). The five states that have the highest number of directed and/or incidental swordfish permit holders are Florida, New Jersey, Louisiana, New York, and North Carolina. Florida has more than three times the number of swordfish PLL vessels than the next state. It is also the closest state to the area where the proposed research project would occur.

Table 4.5 Number and Percentage of Commercial Swordfish Directed and Incidental Permit Holders by State as of October 2016.

Commercial Swordfish Permits		
State	Total	%
Florida	114	44.2%
New Jersey	37	14.3%
Louisiana	33	12.8%
New York	18	7.0%
North Carolina	16	6.2%

Texas	8	3.1%
South Carolina	7	2.7%
Maine	5	1.9%
Massachusetts	5	1.9%
Maryland	4	1.5%
Pennsylvania	3	1.2%
Connecticut	2	0.8%
Delaware	2	0.8%
Virginia	2	0.8%
Rhode Island	1	0.4%
Trinidad/Tobago	1	0.4%
Grand Total	258	100%

Under Alternative 1 (No Action), the adverse direct social and economic impacts of the current EFC PLL Closed Area, which affects the PLL fishery generally, would continue to affect vessels including those involved in the research project. These direct adverse economic impacts include lost revenues from decreased swordfish landings and additional expenditures for fuel, food, and ice due to increased steaming time to open fishing grounds, which generally are further from shore than the closed areas (NMFS, 2000). Increased steaming time also has a negative social impact by causing fishermen to be away from port for longer periods of time. Alternative 1 would maintain the existing indirect socio-economic benefits that may accrue to the recreational fishing sector, including the charter/headboat fleet, as a result of the current closure, by avoiding commercial/recreational gear conflicts and competition for fish between sectors. Not conducting the research under the No Action alternative would not change fishing practices or revenues from the fishery in any way.

Alternatives 2 and 3 are not expected to result in significant social or economic impacts. Minor direct short-term positive socio-economic benefits could occur under Alternatives 2 and 3, whereby a limited number of vessels are proposed to be issued an EFP to participate in the research project. These alternatives could potentially provide direct socio-economic benefits for participating PLL vessels through increased swordfish landings and potentially lower fuel, food, and ice costs. Although these vessels would be allowed to retain any legal species and legal-sized tunas and swordfish, the goal of the proposed research is to collect and compare scientifically valid information on catch and catch rates from within and outside the EFC PLL Closed Area. The projected number of swordfish and tunas to be caught for research purposes could offset the extra costs incurred as a result of the project. These extra costs include providing for a percentage of the required observer coverage, purchasing software and hardware for electronic logbooks, installing upgraded electronic monitoring equipment, real time data collection and transmission, payment of the principal investigator, preparation of reports, and potential lost fishing time due to taking photographs and fin clips from all sharks that are released alive, and collecting biological samples from all dead sharks. Without this compensation, it is unlikely that PLL vessel owners would be willing to participate in the research project. Additionally, in the long-term, the project could potentially provide indirect socio-economic benefits by providing fishery management information regarding real-time electronic logbook reporting, enhanced electronic video monitoring, and improved biological information collection on shark species and other species. There is also a potential indirect social benefit by creating a model for future PLL closed area research, if the proposed research project is successful at providing scientifically valid catch and catch rate information and other information.

Table 4.6 Estimated economic impact of the proposed EFP fishing activity.

Species	Likely Expected Difference in Number of Fish Kept	Average Weight	Price per pound	Change in revenue
Swordfish	4,776	91.7	4.58	\$2,005,853
Bluefin Tuna	-20	389	7.67	-\$59,634
Yellowfin Tuna	-838	65.7	3.56	-\$196,001
Bigeye Tuna	-1,262	51.7	5.13	-\$334,709
Albacore Tuna	-844	38.8	1.78	-\$58,290
Total				\$1,357,219

Source: Average 2014 to 2015 logbook and dealer weighout slip data for the proposed research vessels and average dealer prices from Table 3.5.

Table 4.6 above details NMFS estimate of the economic impact that Alternatives 2 and 3 would potentially have on the vessels involved in this EFP. As discussed earlier, the primary economic impact would be based on expected increases in swordfish landings and decreases in bluefin tuna, yellowfin tuna, bigeye tuna, and albacore landings. NMFS analyzed the average weight of those species landed by the vessels that may be authorized to participate in the research project using weighout slip data from 2014 to 2015. Ex-vessel price data is the average of 2014 to 2015 prices reported for those species in Table 3.6. The overall change in revenue was then calculated by multiplying the likely expected difference in the number of fish kept (based on Table 4.4) by the average weight and price per pound for that species, and then the changes were summed across all species. An estimated increase in \$2 million of swordfish landings were offset by decreases in tuna landings for an overall estimated increase in \$1,357,219 in revenue for the vessels associated with this EFP. Since this EFP would involve six vessels, the per vessel impact is estimated to be \$226,203 per vessel per year relative to otherwise authorized, normal fishing operations occurring only in open areas. The potential increases in swordfish landings revenue might be slightly overestimated if the increase in EFC PLL Closed Area swordfish landings causes ex-vessel price to decrease as a result in the sharp increase in local supply of fresh swordfish. This local supply increase could also potentially decrease the ex-vessel price of swordfish that other vessels not authorized to participate in the research project and fishing in the Florida East Coast statistical area might also receive.

There could be adverse indirect socio-ecological impacts to the recreational fishing community resulting from potential gear conflicts and reduced catches of HMS and other species. Negative social impacts associated with conducting this research may occur in communities with high numbers of recreational anglers who target swordfish and tunas. Many anglers believe that even a limited return of PLL fishing in the EFC PLL Closed Area under strict research protocols could harm recreational catches. Regardless of actual impacts, this action would likely be perceived negatively by the recreational fishing sector. The east coast of Florida is the primary area that would be sensitive to any potential impacts on the recreational fishing sector given the large number of recreational anglers in that location. NMFS anticipates that these concerns could be partially mitigated because the proposed research area is located far offshore, and well north of where the vast majority of Florida anglers are concentrated. Also, the strict research protocols associated with the research project could mitigate concerns of recreational anglers.

Additional information pertaining to the economic impacts associated with Alternatives 1, 2, 3 are provided in Chapter 6 of this document.

Conclusion

Given the size, scope, duration, and strict research protocols associated with the proposed research project, NMFS does not anticipate that the preferred alternative would result in any significant ecological, social, or economic impacts. Overall fishing effort is not expected to increase compared to the baseline of normal operations that would occur in open areas because the same amount of effort that is currently taking place in open areas would shift into the EFC PLL Closed Area. NMFS does not anticipate increased interactions with sharks, but as explained above, would include terms and conditions in the EFP to limit interactions and mortality and ensure that sharks are properly identified. Furthermore, the management measures that have been implemented in the PLL fishery since 2001, (including, but not limited to, circle hooks, gear restrictions, careful release equipment and training, individual bluefin tuna quotas, catch quotas, prohibited species, and electronic video monitoring) in combination with the strict research protocols associated with the proposed research project are expected to mitigate any unforeseen ecological impacts such as unexpected bycatch levels. Therefore, NMFS is proposing to issue an EFP that would evaluate PLL catches and catch rates of target and non-target species within a portion of the EFC PLL Closed Area to evaluate the effectiveness of existing area closures at meeting current conservation and management goals under current conditions using standardized PLL gear on a specified number of commercial vessels. The information and data collected as part of this research project would help the Agency consider future management measures, as appropriate.

4.3 Impacts on Essential Fish Habitat

This proposed action is not anticipated to have an impact on essential fish habitat (EFH). The only gear proposed to be deployed is PLL gear which has minimal or no impact on EFH for HMS or other species. PLL gear is typically fished in the water column where it does not come into contact with the benthic substrate. Thus, no impacts to benthic habitat or other EFH are anticipated.

4.4 Impacts on Other HMS and Finfish Species

The proposed research is not expected to alter U.S. fishing practices or effort and therefore should not have any noticeable impact on other highly migratory and finfish species that have not already been considered in the 2006 Consolidated Atlantic HMS FMP. Overall fishing effort is not expected to increase because the same amount of effort that is currently taking place in open areas would shift into the EFC PLL Closed Area. Furthermore, the management measures that have been implemented in the PLL fishery since 2001, (including, but not limited to, circle hooks, gear restrictions, careful release equipment and training, individual bluefin tuna quotas, catch quotas, prohibited species, and electronic video monitoring) in combination with the strict research protocols associated with the proposed research project are expected to mitigate any unforeseen ecological impacts.

4.5 Impacts on Protected Species Listed under the Endangered Species Act or Marine Mammal Protection Act

The proposed action would not have an adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species. NMFS does not expect that this action would increase overall fishing effort by PLL vessels, as the participating vessels would otherwise be fishing in open areas of the Atlantic Ocean. Therefore, interactions with ESA-listed species, critical habitat for these

species, and marine mammals are not expected to increase, although NMFS would continue to monitor the fishery and re-assess any impacts of the action annually.

Prior research in the EFC closure area from 2008 – 2010 found no interactions with marine mammals. Similarly, only five observed interactions occurred in the open area of the FEC from 2013 - 2015 based upon observer data (2015: one pilot whale; 2014: one pan-tropical spotted dolphin; 2013: one unidentified marine mammal; one unidentified beaked whale, one Minke whale). With such low interaction rates, an extrapolation would yield less than one animal given the effort proposed in the research study. Therefore, the anticipated impact on marine mammals is expected to be minimal.

NMFS estimates that leatherback and loggerhead sea turtle interactions would be reduced if the EFP were approved (versus if the same amount of fishing effort were to occur only in open areas). NMFS would monitor the proposed project and re-assess any impacts associated with the proposed action annually.

The effect of Atlantic HMS PLL fleet operations is the subject of ongoing ESA Section 7 consultations. Reinitiation of consultation was requested on March 31, 2014, for the PLL fishery to assess impacts on listed species, including several turtle species. Pending completion of consultation, that fishery continues to operate consistent with the Reasonable and Prudent Alternative (RPA) and Terms and Conditions specified in a 2004 Biological Opinion (e.g., hook type, bait type, mandatory workshops). NMFS requested reinitiation of consultation due to new information on mortality rates and total mortality estimates for leatherback turtles that had exceeded those specified in the RPA, changes in information about leatherback and loggerhead populations, and new information on sea turtle mortality. While the mortality rate measure needs to be re-evaluated, NMFS determined that this does not affect the overall ability of the RPA to avoid jeopardy during the reinitiation.

The consultation will address the effects of PLL fishery operations on the Central and Southwest Atlantic Distinct Population Segments (DPS) of scalloped hammerhead sharks, which are listed as threatened species under the ESA (79 FR 38213, July 3, 2014). On October 30, 2014, the HMS Management Division requested reinitiation of consultation for activities previously consulted on in the 2001 Atlantic HMS BiOp and the 2012 Shark and Smoothhound BiOp and also provided supplemental information for the separate reinitiation of consultation requested on March 31, 2014, for the PLL fishery.

NMFS has made determinations that continued operation of the PLL fishery during consultation does not constitute an irretrievable or irreversible commitment of resources in accordance with section 7(d) of the ESA and that continued compliance with the RPAs and Reasonable and Prudent Measures in existing biological opinions will avoid jeopardy to listed species. The proposed research project is not anticipated to affect listed species in any way not previously analyzed in those biological opinions.

4.6 Environmental Justice Concerns

Executive Order 12898 requires that federal actions address environmental justice in the decision-making process. In particular, the environmental effects of the actions should not have a disproportionate effect on minority and low-income communities. The approval of this proposed research project would not have any effects on human health. Additionally, the project is not expected to have any significant social or economic effects and should not have a disproportionate effect on minority and low-income communities.

4.7 Comparison of Alternatives

Table 4.7 provides a qualitative comparison of the impacts associated with the various alternatives considered in this amendment. This table summarizes the impacts that were discussed in detail in Sections 4.1 – 4.4.

Table 4.7 Comparison of Alternatives

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
Alternative 1: Do not issue EFPs to conduct research with PLL vessels in the EFC PLL Closed Areas (No Action)	Direct	Short-term	⊕ ₊	⊕ ₊	⊖ ₋
		Long-term	⊕ ₊	⊕ ₊	⊖ ₋
	Indirect	Short-term	⊕ ₊	⊕ ₊	⊖ ₋
		Long-term	⊕ ₊	⊕ ₊	⊖ ₋
	Cumulative	Short-term	⊕ ₊	⊕ ₊	○
		Long-term	⊕ ₊	⊕ ₊	○
Alternative 2: Issue EFPs to conduct year-round research with PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00" N Lat., 79° 50" W. Long. and 28° 0" N. Lat, 79° 50" W. Long.	Direct	Short-term	○	○	⊕ ₊
		Long-term	○	○	○
	Indirect	Short-term	○	○	⊖ ₋
		Long-term	○	○	○
	Cumulative	Short-term	○	○	○
		Long-term	○	○	○
Alternative 3: Issue EFPs to conduct year-round research with PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00" N. Lat., 80° 20" W. Long, to 29° 00" N. Lat, , 80° 20" W. Long. and then proceeding southward in straight lines located just west of the 100 fathom isobath to 28° 00" N. Lat., 80° 10" W. Long. - Preferred Alternative	Direct	Short-term	○	○	⊕ ₊
		Long-term	○	○	○
	Indirect	Short-term	○	○	⊖ ₋
		Long-term	○	○	○
	Cumulative	Short-term	○	○	○
		Long-term	○	○	○

Symbol Key:

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
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○ Neutral Impacts

○₋ Minor Adverse Impacts

○₊ Minor Beneficial Impacts

○₋ Moderate Adverse Impacts

○₊ Moderate Beneficial Impacts

4.8 Cumulative Impacts

"Cumulative impacts" refers to the impact on the environment resulting from the incremental effects of the action added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR 1508.7). Cumulative effects are linked to incremental actions that individually may have small outcomes, but that, in the aggregate and combined with other factors, can result in greater environmental effects on the affected environment. Analyses should focus on those effects that are truly meaningful. This section analyzes the potential cumulative effects of granting the EFP considered in this EA and concludes that the cumulative impacts will not be significant.

The proposed action would issue an EFP to participating vessels to compare catch and catch rates between open and closed areas. The EFP is not expected to increase fishing effort, or cause significant ecological, economic, or social impacts. The alternatives analyzed in this EA would continue to prevent overfishing without jeopardizing the sustainability of any target or non-target species. The proposed research project is of limited scope and duration with a specified number of participating vessels and amount of allowable sets. All catches would be counted against, and stay within, established species specific quotas. Additionally, participating vessels would be required to abide by other existing regulations including, but not limited to: circle hook requirements, bait restrictions, careful release protocols, VMS requirements, electronic monitoring requirements, reporting requirements, quotas, retention limits, individual bluefin tuna quotas, minimum size limits, landing restrictions, a commercial billfish possession prohibition, authorized gears, and observer coverage, and permit conditions specifically designed to limit shark interactions and morality.

Past actions

On May 28, 1999, NMFS published a final rule (64 FR 29090) that implemented the HMS FMP and Amendment 1 to the Atlantic Billfish FMP, and that consolidated regulations for Atlantic HMS. The Final Environmental Impact Statements (FEIS) associated with these FMPs addressed the rebuilding and ongoing management of Atlantic tunas, swordfish, sharks, and billfish. Alternatives to rebuild and manage the Atlantic swordfish and tuna fisheries included, among other things, quotas levels, retention and size limits, upgrading restrictions, overharvest and underharvest adjustment authority, time/area closures, and permitting and reporting requirements, including a limited access system. The HMS FMP concluded that the cumulative long-term impacts of these and other management measures would be to rebuild overfished fisheries, minimize bycatch and bycatch mortality, to the extent practicable; identify

and protect essential fish habitat; and minimize adverse impacts of fisheries regulations on fishing communities, to the extent practicable.

Between 1999 and 2005, NMFS finalized three supplemental EIS's addressing PLL fishing. The first one, published in June 2000, analyzed management measures, particularly time/area closures, to reduce bycatch, bycatch mortality, and incidental catch in the PLL fishery. The final actions were expected to have negative direct, indirect, and cumulative economic and social impacts for PLL fishermen and were expected to have positive benefits regarding reduction in bycatch and bycatch mortality.

The second supplemental environmental impact statement, published in July 2002, implemented the measures in a June 14, 2001, BiOp addressing sea turtle bycatch and bycatch mortality in HMS fisheries. Certain measures in this rulemaking, such as the closure of the Northeast Distant Area (NED) to PLL vessels, were expected to have negative direct, indirect, and cumulative economic and social impacts on PLL fishermen, that were mitigated in the short-term for vessels that participated in an experimental fishery in the NED. Other measures, such as requiring gangions to be 10 percent longer than floatlines, requiring the use of corrodible, non-stainless steel hooks, reporting lethal sea turtle takes within 48 hours, and posting sea turtle handling and release guidelines in the wheelhouse were not expected to have serious impacts.

The third supplemental environmental impact statement, published on July 6, 2004 (69 FR 40734), implemented measures intended to reduce sea turtle interactions in the PLL fishery. The June 2004 BiOp associated with this action found that the continued operation of the fishery was not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles, but was likely to jeopardize the continued existence of leatherback sea turtles. The BiOp established incidental take statements for leatherback and loggerhead sea turtles and implemented measures designed to reduce sea turtle interactions and mortalities in compliance with the ESA and other applicable law. These measures included the mandatory use of circle hooks and specified baits in the PLL fishery, along with the mandatory possession and use of careful release gears.

NMFS published the Final Consolidated Atlantic HMS FMP in July 2006 (July 14, 2006, 71 FR 40096), that included, among other things, mandatory workshops for the safe handling and release of protected species, shark identification workshops, rebuilding and preventing overfishing of several HMS, changes to the bluefin tuna quota management structure, authorization of additional gears, and a comprehensive review of all new HMS EFH information.

Since publication of the Consolidated HMS FMP, the Atlantic swordfish fishery was also modified by rulemaking in 2007 that changed several upgrading restrictions for vessels, increased the swordfish retention limits of limited access incidental permit holders, and increased retention limits of charter/headboat and Angling category permits (June 7, 2007, 72 FR 31688). A billfish tournament requirement to use circle hooks with natural bait and natural bait/artificial combinations became effective on January 1, 2008. An open-access Swordfish General Commercial permit was implemented in August 2013 (August 21, 2013, 78 FR 52012) that authorized the use of certain handgears to harvest swordfish in portions of the Atlantic Ocean, including the Gulf of Mexico and U.S. Caribbean Sea. Amendments 2, 3, 5a, and 6 amended Atlantic shark management measures. Amendment 4 (2012) created a new Commercial Caribbean Small Boat permit to improve HMS management in the U.S. Caribbean. Amendment 7 (2014) implemented several new bluefin tuna management measures including quota reallocation, two new PLL

gear restricted areas (GRAs), individual bluefin tuna quotas (IBQs), new VMS bluefin tuna reporting requirements, and electronic monitoring of longline vessels. Amendment 9 (2015) implemented new management measures for smoothhound shark species. Most recently, upgrade restrictions were removed for vessels issued Swordfish Directed and Atlantic Tunas Longline category permits (November 23, 2016, 81 FR 84501).

Present and Reasonably Forseeable Future Actions

Other present and reasonably foreseeable future actions occurring, or that will occur, in the research area and that may be meaningful to the action analyzed in this EA include the operation of other fisheries for HMS and other species. These include recreational fisheries and commercial fisheries that utilize fishing gears other than pelagic longline gear and that fish for HMS, as managed under the 2006 Consolidated Atlantic HMS FMP, or other federally managed species, as managed by the South Atlantic Fishery Management Council. Management measures for those non-PLL fisheries were developed and analyzed in EAs and Environmental Impact Statements prepared for fishery management plans for dolphin/wahoo, Spanish mackerel, king mackerel, and the South Atlantic snapper/grouper fishery. For a comprehensive description of these FMPs, refer to pages 280 – 306 in the draft EIS prepared for Amendment 5b to the 2006 Consolidated HMS FMP (NMFS 2016b).

An FMP amendment (Amendment 5b) is underway to address management of dusky sharks, but is not yet complete. A recent stock assessment concluded that dusky sharks are overfished and experiencing overfishing. When finalized, the measures in Amendment 5b are expected to achieve needed reductions in mortality of dusky sharks to end overfishing and rebuild the stock. Proposed measures include requiring: recreational shark fishermen to obtain an endorsement and take an online training quiz to improve shark identification and regulatory awareness; recreational shark fishermen to use circle hooks when fishing for sharks; commercial fishermen to release non-retained sharks with no more than 3 feet of gear on the animal; commercial fishermen to learn about best practices for releasing dusky sharks during existing workshops on handling and release; commercial fishermen to move one nautical mile after an interaction with a dusky shark and to abide by a fleet communication protocol when dusky sharks are caught; and, commercial fishermen using bottom longline gear to use circle hooks. NMFS expects to release Final Amendment 5b in March 2017.

NMFS plans to issue additional EFPs, SRPs, and display permits in 2017 which would authorize research and collection activities in this area. These activities are typically of limited duration, magnitude, and area and all include reporting requirements and limited authorizations for harvest of sharks. Each of these permits will be considered on a case-by-case basis and impacts from each permit will be analyzed separately. From April through June, a shark survey conducted by the Northeast Fisheries Science Center staff would be conducted in the area using bottom longline gear. This research would only deploy a limited number bottom longline sets in the research area during the beginning of the survey. The Southeast Fisheries Science Center is also expected to collect young-of-the-year bluefin tuna in 2017 using recreational vessels and rod and reel gear in portions of the research area. There are also five studies conducted by non-NOAA scientists for shark research that may occur in portions of the study area that primarily use handgear and drumline gear. Typically, these non-NOAA shark research activities are conducted for less than ten months a year and are comprised of 10 or less trips per year. The main objective of this shark research is tagging but limited sampling (five or less sharks) may occur under these permits. NMFS also plans to issue display permits for sharks which would allow the limited collection of

Atlantic sharks for public display. These display permits either utilize rod and reel gear or small scale bottom longlines (e.g., less than 100 hooks) with short soak times. Many of the collections under these display permits occur close to shore either in state waters or in federal waters close to the state water boundary. These permits, if issued, have no potential for significant individual or cumulative impacts either individually or cumulatively.

Any future actions would also be analyzed consistent with NEPA requirements. Under the preferred alternative, the research to be conducted is not expected to change interactions with protected species or result in significant cumulative impacts in addition to any of those previously analyzed.

Non-fishing actions that presently occur and are expected to occur in the future include sea going vessel traffic for commercial and or recreational purposes. This type of vessel movement occurs in other areas where pelagic longline fishing gear is utilized, including the research area of this study that is open year-round to pelagic longline fishing, with minimal interactions of fishing gear with vessels. This is because pelagic longline gear is fished deep enough in the water column as to allow vessels to move above it and avoid entanglement. Also, pelagic longline marker buoys and/or “high-flyers” are well marked to enable vessel avoidance. Under the preferred alternative, the research to be conducted is not expected to result in any difficulty with vessel navigation in the research area.

Considering the incremental effects of the action added to other past, present, and reasonably foreseeable future actions, NMFS does not expect any adverse significant cumulative impacts from the preferred alternative outlined above.

5.0 MITIGATION AND UNAVOIDABLE ADVERSE IMPACTS

5.1 Mitigating Measures

As discussed in Chapter 4, the preferred alternative is not anticipated to have any significant ecological, economic, or social impacts given the size, scope, duration, and strict research protocols associated with the proposed research project. Further, although the maximum authorized level of fishing effort for this project could result in some increase in fishing effort, NMFS expects that vessels authorized under this EFP would fish similarly to their past fishing practices. From 2014 to 2015, the vessels identified on this EFP fished a median of 120 sets per year with 600 hooks per set based on logbook records. The likely expected fishing effort, based on historical fishing rates that factor in weather and vessel maintenance, is not expected to substantially change. The vessels involved would otherwise be engaged in commercial fishing activities outside of the EFC PLL Closed Area. Overall, to provide some historical perspective to this proposed project, it is informative to indicate that the number of active U.S. fishing vessels that have caught swordfish has declined by 45 percent from 2000 (before the EFC PLL Closed Area became effective) and 2015. Through this study, NMFS is seeking to collect data that would allow the Agency to compare catch and catch rates between the closed and open areas under current fishery conditions, while achieving conservation and harvesting goals. Data obtained from this project could inform future fishery management.

PLL vessels participating in the research project would be required to conduct sets within the EFC PLL Closed Area only under the following conditions: Agree to a 2:1 ratio of sets within the closed and open areas to allow for comparative datasets; agree to carry an industry-funded fisheries observer for a minimum of 33 percent of the total project sets (waived if a Pelagic Observer Program (POP) observer is

assigned to the vessel); agrees to fish only with project-standard gear; and, the vessel has a working video catch monitoring system, which would be used to verify and supplement the on-board observer with 100% video coverage. Finally, one hundred percent of electronic monitoring data would be reviewed for all sets.

For participating vessels, Digital Globe, Inc. (Herndon, VA, USA; <https://www.digitalglobe.com>) has developed a custom *Insight Explorer* program within its proprietary *Sea Star* software that would establish a time/date and GPS-based geographic location tag for each event entered at sea by the vessel operator; this program is now in final testing, concurrent with the planned deployment of the system in 2017. The vessel operator would manually enter the species for each capture event during the time of capture, which can then be linked directly to the video feed maintained by NOAA, which is itself time/date tagged. A daily summary of these manual entries would then be automatically compiled by the software and sent via satellite feed at midnight every night to both the researcher (EFP applicant) and vessel owner, which would be compiled into an electronic logbook and thus provide nearly real-time monitoring of the project catches. If requested, a copy of this daily summary can also be provided to NOAA. During the project, a randomly selected set of individual capture events would be pulled from the database, and a request for the respective video feed from that time/date tag would be made to NOAA, who would provide it with the researcher. The video would then be compared by the researcher with the electronic logbook data for the event as an auditing mechanism for the electronic logbooks. A letter from Digital Globe describing this system is included in the EFP application package.

The study would use the electronic logbook data for the purposes of spatial and catch rate analyses, while the at-sea fisheries observer data would be used for length-based analyses. The proposed research project would also provide an analysis of the accuracy of the electronic capture event system via the auditing of the NOAA video monitoring data. Audits would be conducted at three-month intervals throughout the duration of the project, then results used in ongoing consultations on the project with NOAA.

All vessels would be required to deploy currently authorized PLL gear to ensure comparative datasets. Final gear parameters (e.g., leader lengths) would be determined during collaborative discussions with participating captains, but would also fall within authorized gear standards (e.g., floatline length at least 110% of gangion length).

Participating vessels would also be required to possess and utilize protected species disentanglement and release equipment and be certified in its use. Vessels would continue to be bound by all other bycatch reduction requirements, such as changing fishing locations after an interaction with marine mammals or sea turtles. Additionally, vessels would continue to be bound by all other fishing regulations, including minimum sizes, quotas, individual bluefin tuna quotas, limited access permit restrictions, prohibited species restrictions, and others. Also, all vessels may be approved to participate in the research project only after a NMFS has completed compliance review to detect any previous violations.

To mitigate both ecological and social impacts, NMFS carefully selected a study area that is expected to minimize the bycatch of protected resources, as well as minimize fishing gear conflicts between recreational and commercial participants. The recreational fishing community has opposed previous research projects utilizing commercial PLL vessels to collect data in areas where gear conflicts between commercial and recreational swordfish fishermen could occur. NMFS anticipates that these

concerns could be partially mitigated because the proposed research area is located far offshore, and well north of where the vast majority of Florida anglers are concentrated. Also, the strict research protocols associated with the research project could mitigate concerns of recreational anglers. With regard to protected resources, the previous study in a similar area from 2008 – 2010 interacted with very few sea turtles and no marine mammals.

In issuing an EFP to conduct this research, NMFS would include strict bycatch and protected species monitoring requirements to immediately contact the HMS Management Division if a protected species interaction should occur. Vessel operators would be required to submit electronic logbooks at the end of each set to the researcher; these data would be provided to NMFS upon request. Further, as with all EFPs, the Agency would require that interim summary reports to be submitted to the Agency within five days of the return to port to allow close monitoring of the research project. Any sea turtle interactions would be counted against the ITS established in the 2004 BiOp issued for the PLL fishery.

To ensure that shark bycatch and bycatch mortality is minimized, several additional mitigating measures are being considered. These are described in detail in Sections 2.2 and 2.3.

For these reasons, and as discussed in Chapter 4.0 of this EA, NMFS does not expect that the preferred alternative, which would allow a limited study in a portion of the EFC PLL Closed Area, would have significant adverse ecological, economic, or social impacts. As described above, NMFS would closely monitor the study and take appropriate action, if necessary, to mitigate interactions with protected species or other bycatch species. The project, if approved, would be reviewed annually and, pending annual review of any changed environmental conditions or impacts and of catches and catch rates of all species, as well as individual vessel performance, could be re-authorized for no more than two additional 12-month periods.

5.2 Unavoidable Adverse Impacts

This proposed research project would assist NMFS in achieving the objectives of the 2006 Consolidated HMS FMP and its amendments by allowing for the collection of important data to better gauge the effects of existing regulations. The projected effort expended for this project would not represent an increase in overall fishing effort as the vessels involved would be otherwise engaged in commercial fishing activities in open areas. For species that are overfished, the size, scope, duration, and strict research protocols associated with the proposed research project are expected to have no significant adverse impacts, given that U.S. catches of these species represent only a small percentage of international catches (approximately 5 percent). Furthermore, the United States has remained well below its ICCAT-recommended quota for many species, including swordfish and bluefin tuna, so any potential increase in catches of these species would not be anticipated to have any significant impact on rebuilding. There is a possibility that catches and discards of undersized swordfish could increase relative to fishing activities outside of the EFC PLL Closed Area, however the use of circle hooks is anticipated to mitigate mortality of such bycatch. As discussed in previous chapters in this document, interactions with protected resources are projected to be minimal.

The preferred alternative is consistent with the 2006 Consolidated HMS FMP and its amendments, the Magnuson-Stevens Act, and other applicable law. In considering the alternatives, NMFS preferred an alternative that, along with the mitigating measures discussed in Section 5.1, would minimize

adverse ecological, social, and economic impacts while simultaneously allowing for the collection of current fishery data necessary to achieve the objectives of the 2006 Consolidated Atlantic HMS FMP in a scientifically rigorous manner.

5.3 Irreversible and Irretrievable Commitment of Resources

The proposed research project is not expected to result in any irreversible or irretrievable commitment of resources due to its limited size, scope, duration, and strict research protocols.

6.0 ECONOMIC EVALUATION

This section assesses the economic impacts of the alternatives presented in this document. Additional economic and social considerations and information are discussed in Chapters 3 and 4 of this document.

6.1 Number of Fishing and Dealer Permit Holders

In order to examine the baseline universe of entities potentially affected by the preferred alternative, NMFS analyzed the number of permits that were issued as of October 2016 in conjunction with HMS fishing activities. The following tables provide data on sectors that the preferred alternative could impact.

As of October 2016, there were a total of 954 commercial permit holders in the Atlantic swordfish fishery (186 Directed, 72 Incidental permits, 83 Handgear, and 613 General Commercial). Approximately 258 of these of these vessels had “valid” swordfish permits that allow for the deployment of PLL gear because they possess the requisite three limited access permits for swordfish, shark and Atlantic Tunas Longline. However, only approximately 130 of these vessels possess IBQ shares that allow for the deployment of PLL gear. There were 79 Directed swordfish permits and 35 Incidental swordfish permits issued to vessels in Florida, as of October 2016. Table 6.1 provides a summary of these commercial permit holders by year. Further detail regarding commercial permit holders is provided in the 2006 Consolidated Atlantic HMS FMP, its amendments, and annual HMS SAFE Reports.

Table 6.1 Swordfish Limited Access Permits Issued From 2002 - 2016 (as of October for each year).

Year	# Directed Swordfish	# Incidental Swordfish	# Swordfish Handgear
2016	186	72	83
2015	188	72	83
2014	183	66	77
2013	185	71	81
2012	184	73	77
2011	178	67	78

Year	# Directed Swordfish	# Incidental Swordfish	# Swordfish Handgear
2010	177	72	75
2009	187	72	81
2008	181	76	81
2007	180	79	82
2006	191	86	88
2005	190	91	92
2004	195	99	96
2003	206	99	95
2002	205	110	94

Error! Reference source not found. below provides a summary of HMS Charter/Headboat (CHB) permit holders, by state. As of October 2016, there were 3,594 HMS CHB permit holders. The highest numbers of HMS CHB permit holders are located in Massachusetts, Florida, New Jersey, and North Carolina.

Table 6.2 HMS CHB Permits by State (as of October 1, 2016)

State/Territory	HMS CHB Permits	State/Territory	HMS CHB Permits
AL	65	NC	322
CT	67	NH	95
DE	97	NJ	447
FL	614	NY	296
GA	34	OH	2
ID	1	OK	1
IL	2	PA	16
KY	1	PR	27
LA	92	RI	122
MA	686	SC	127
MD	116	TX	102
ME	124	VA	91
MI	1	VI	16
MS	25	WV	2
2016 * Total		3,594	
2015 ** Total		3,663	

* Permit totals are as of October 1, 2016. ** Permit totals are as of December 31, 2015.

The number of HMS Angling category permits was 20,020, as of October 2016. There is no specific swordfish angling permit, so it is not possible to determine the number of recreational anglers that specifically target swordfish. Of the total number of HMS Angling permits, 3,880 Angling category permit holders identify a Florida port as their vessel's homeport.

The alternatives analyzed for this proposed action would directly impact six Directed and Incidental Swordfish permit holders that would initially be included on an EFP to participate in the project, and up to seven “backup” vessels that could be included on an EFP to participate in the research project, if necessary. The alternatives could indirectly impact Florida-based HMS CHB and Angling category permit holders that might fish in same area as the proposed research project. The tables and numbers presented above indicate that a total of 4,494 HMS CHB and Angling permit holders in Florida could be indirectly affected by the proposed scientific research. Approximately 114 vessel owners possessing valid Directed or Incidental Swordfish permits in Florida could also be indirectly affected by the proposed alternatives because they compete in the same market as vessels that would be included on the EFP. In total, the proposed action could potentially impact approximately 4,608 HMS permit holders in Florida. Of these, 728 (CHB and Swordfish Incidental and directed permit holders) are considered small entities.

6.2 Gross Revenues of Fishermen

Please see Section 3.6.2 for a description of fishery gross revenues.

6.3 Variable Costs and Net Revenues

Please see Section 3.6.3 for a description of variable costs and net revenues.

6.4 Expected Economic Impacts of the Alternatives Considered

NMFS analyzed three alternatives for conducting scientific research experiments using pelagic longline gear in the EFC PLL Closed Area of the Atlantic Ocean. These three alternatives include: Alternative 1, not issuing an EFP to conduct research with PLL vessels in the EFC PLL Closed Area; Alternative 2, issuing an EFP to conduct year-round research with PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00” N Lat., 79° 50” W. Long. and 28° 0” N. Lat, 79° 50” W. Long.; and, Alternative 3, issuing an EFP to conduct year-round research with PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00” N. Lat., 80° 20” W. Long, to 29° 00” N. Lat, , 80° 20” W. Long. and then proceeding southward in straight lines located just west of the 100 fathom isobath to 28° 00” N. Lat., 80° 10” W. Long. The following sections below discuss the economic impacts of the various alternatives considered.

Both Alternative 2 and Alternative 3 would allow a limited number of PLL vessels (six vessels with up to seven “backup” vessels) to deploy approximately 45 sets/vessel/quarter using non-offset 16/0 or larger circle hooks (up to 750 hooks per set) both within and outside of the EFC PLL Closed Area for one year to conduct scientific research using standardized PLL gear. A maximum of approximately 1,080 sets (six vessels x 180 sets/year) would be deployed annually, with 2/3rds of the sets (720 sets) occurring within the EFC PLL Closed Area and 1/3 (360 sets) occurring in open areas. Vessels would be subject to 33 percent observer coverage (a minimum of 15 observed sets per quarter per vessel with five sets in each of the three sub-areas) using either NMFS-trained observers or scientific research staff. All other terms, conditions, and recordkeeping and reporting requirements associated with the issuance of an EFP are identical under both Alternative 2 and Alternative 3. The only difference between these two alternatives is that Alternative 3 incorporates a larger proposed research area within the EFC PLL Closed

Area. Because both alternatives propose to authorize the same level of fishing effort in the EFC PLL Closed Area (720 sets), socio-economic impacts are similar. Alternative 3 extends westward to fully include the 100 fathom bathymetric contour within its boundary, which is easily recognizable on depth finders or bathymeters. Alternative 3 is far offshore which could reduce encounters with recreational fishing vessels, but it is closer to shore than Alternative 2 which could reduce steaming time and trip costs (fuel, food, ice, etc.). Because of moderately improved economic characteristics, Alternative 3 is preferred at this time.

Alternative 1

Alternative 1 considers maintaining the status quo by not issuing an EFP to conduct research with PLL vessels in the EFC PLL Closed Area and an open area and maintaining existing regulations, which prohibit PLL fishing in the EFC PLL Closed Area (No Action). This alternative would result in no change to the existing economic baseline conditions. It would continue the existing adverse economic impacts associated with the current EFC PLL Closed Area for PLL fishermen. These adverse economic impacts include lost revenues from decreased landings and additional expenditures for fuel, food, and ice due to the increased steaming time to more distant fishing grounds (NMFS, 2000). Alternative 1 would maintain the perceived socio-economic benefits that accrue to the recreational fishing sector, including the CHB fleet, by potentially reducing commercial/recreational gear conflicts and competition for fish between sectors. The No Action alternative does not provide important information regarding current differences in catch rates between the open and closed areas. This information could provide more flexibility for fishery management in the future.

Alternative 2

Alternative 2 is not expected to result in significant social or economic impacts. According to the estimates in Table 4.4, an additional 4,776 to 8,954 swordfish would potentially be landed if the proposed research project is approved. Minor direct short-term positive socio-economic benefits could occur under Alternative 2 for participating PLL vessels through increased swordfish landings and potentially lower fuel, food, and ice costs. Although these vessels would be allowed to retain any legal species and legal-sized tunas and swordfish, the goal of the proposed research is to collect and compare scientifically valid information on catch and catch rates from within and outside the EFC PLL Closed Area. The projected number of swordfish and tunas to be caught for research purposes could offset the extra costs incurred as a result of the project. These extra costs include providing for a percentage of the required observer coverage, purchasing software and hardware for electronic logbooks, installing upgraded electronic monitoring equipment, real time data collection and transmission, payment of the principal investigator, preparation of reports, and potential lost fishing time due to taking photographs and fin clips from all sharks that are released alive, and collecting biological samples from all dead sharks. Without an incentive to cover these extra costs and the costs of fuel, gear, bait, ice, and crew, it is less likely that vessels would be willing to participate in the research project. However, the number of kept tunas (all species combined) is projected to decline by approximately 2,964 to 5,600 tunas if the research project is approved. Similarly, the number of kept dolphin, wahoo, escolar, and oilfish are also projected to decline. Thus, although increased catches of swordfish are likely to occur, the resulting increase in revenue is partially offset by revenue decreases resulting from decreased catches of tunas, dolphin, wahoo, and other commercially important species.

Additionally, in the long-term, the project could potentially provide indirect socio-economic benefits by providing fishery management information regarding real-time electronic logbook reporting, enhanced electronic video monitoring, and improved biological information collection on shark species and other species. There is also a potential indirect social benefit by creating a model for future PLL closed area research, if the proposed research project is successful at providing scientifically valid catch and catch rate information and other information.

An important potential economic benefit of the proposed research project could be the demonstrated ability of PLL vessels to further reduce their bycatch of bluefin tuna and increase their catch of swordfish while fishing in the EFC PLL Closed Area. This is important because PLL vessels are assigned individual bluefin tuna quotas (IBQs), which can limit their ability to conduct fishing trips if sufficient IBQ is not available. The potential ability to conduct more fishing trips and to catch more swordfish could provide economic benefits to participating vessels.

If the proposed research project is successful at providing statistically significant information to compare catch and bycatch rates between the EFC PLL Closed Area and adjoining open areas and demonstrating a reduced bycatch of regulatory discards, then there is a potential to provide a model for similar compensation fishing and research projects in other closed areas in the future. This could benefit both the Agency and the commercial fishing industry by providing more flexibility for fishery management in the future.

There could be adverse economic impacts to the recreational fishing community, including potential gear conflicts and reduced catches. Negative impacts associated with conducting this research project could occur in communities with high numbers of recreational anglers (including CHB vessels) who target swordfish and tunas. Recreational anglers may believe that even a limited return of PLL fishing in the EFC PLL Closed Area under strict research protocols could reduce current and future recreational catches and increase recreational/commercial gear conflicts. The east coast of Florida is an area that would be sensitive to any potential impacts on the recreational fishing sector given the large recreational fishing presence in that location. In previous requests for EFPs in this region, NMFS has received initial opposition from the recreational sector. NMFS anticipates that these concerns would be partially mitigated due to the strictly controlled conditions associated with the research project, enhanced reporting and monitoring requirements, and the annual review process required of the EFP. Also, the proposed research project is far offshore and well north of where the vast majority of Florida anglers are concentrated.

Preferred Alternative 3

The economic impacts associated with Preferred Alternative 3 would be practically identical to those of Alternative 2 because the proposed authorized level of fishing effort is identical. The primary difference between Preferred Alternative 3 and Alternative 2 is that the proposed research area in the EFC PLL Closed Area would extend further west than under Alternative 2. Therefore, Alternative 3 may have slightly greater direct positive economic impacts for participating PLL vessels by providing a larger area for vessels to fish and potentially decreasing fuel and other expenditures (food, ice, etc.) due to decreased steaming time (NMFS, 2000). However the difference in economic impacts between Alternative 2 and Preferred Alternative 3 is not expected to be large because the authorized level of proposed fishing effort in both alternatives would be the same, regardless of the alternative. Similar to Alternative 2, this

alternative would likely to be negatively perceived by the recreational fishing sector on the east coast of Florida due to potential reductions in catches and increased gear conflicts. NMFS anticipates that these concerns would be partially mitigated due to the strictly controlled conditions associated with the proposed research project, enhanced reporting and monitoring requirements, and the annual review process required of the EFP. Also, the proposed research project is far offshore and well north of where the vast majority of Florida anglers are concentrated.

6.5 Net Economic Impacts

NMFS believes that the net national benefits associated with the proposed scientific research project would likely outweigh the costs associated with the project. Scientific information obtained from this research would provide updated information on catch and bycatch rates inside the EFC PLL Closed Area and could lead to advances in electronic reporting, electronic monitoring, and bycatch and bycatch mortality reductions. There could also be net economic benefits associated with the sale of targeted species landed during the proposed research trips. While there could be higher administrative costs to the Agency and fishing industry associated with enhanced monitoring of video cameras, observer reports, and biological samples, the net potential benefits are positive (Table 6.3).

Table 6.3 Net Economic Benefits and Costs for each Alternative.

Alternatives	Net Economic Benefits	Net Economic Costs
Alternative 1 - Do not issue an EFP to conduct research with PLL vessels in the EFC PLL Closed Areas (No Action)	Continuing levels of recreational participation in the EFC PLL Closed Area due to the rebuilt swordfish population and lack of competition for resource access to fishing grounds, and reduced gear conflicts.	Continued absence of current information on catch and catch rates in the EFC PLL Closed Area to inform fishery management. Continuation of reduced revenues for PLL sector from decreased landings of swordfish and continuing fuel, ice, and food expenditures due to extended steaming time to reach open distant fishing grounds.
Alternative 2 - Issue an EFP to conduct year-round research with commercial PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00" N Lat., 79° 50" W. Long. and 28° 0" N. Lat, 79° 50" W. Long., with terms and conditions to minimize interactions with and mortality of dusky sharks and other prohibited shark species.	Potential increase in revenues for participating PLL vessels based on possible increased landings of swordfish, and decreased expenditures on fuel, food, and ice due to reduced steaming time. Potential minor increases in revenues for dealers, wholesalers, and dockside businesses that outfit PLL vessels. Scientific information obtained from this research could provide current information on catch and bycatch rates in the EFC PLL Closed Area to inform fishery management.	Perceived loss of fishing opportunities by recreational sector could lead to minor decreases in recreational and CHB swordfish trips and bookings. Limited potential for economic losses associated with recreational/commercial gear conflicts. Increased Agency and industry costs associated with increased monitoring of video cameras, observer reports, and biological samples.

Alternatives	Net Economic Benefits	Net Economic Costs
<p>Alternative 3 - <i>Issue an EFP to conduct year-round research with commercial PLL vessels in the EFC PLL Closed Area seaward of a straight line connecting 31° 00" N. Lat., 80° 20" W. Long, to 29° 00" N. Lat., 80° 20" W. Long. and then proceeding southward in straight lines located just west of the 100 fathom isobath to 28° 00" N. Lat., 80° 10" W. Long, with terms and conditions to minimize interactions with and mortality of dusky sharks and other prohibited shark species - Preferred Alternative</i></p>	<p>Same as Alternative 2. Slightly higher potential for increase in revenues due to larger geographic area in which participating vessels can fish. Increased spatial scientific information due to larger geographic area in which vessels can fish.</p>	<p>Same as Alternative 2. Slightly higher potential for socioeconomic losses associated with gear conflicts with recreational fishermen targeting swordfish and other HMS species due to slightly larger area of the proposed research area.</p>

7.0 COMMUNITY PROFILES

This chapter serves as a brief overview and determination of the social impacts associated with the proposed research project. A more comprehensive review of community profiles for all HMS fisheries can be found in Section 9 of the Final Consolidated HMS FMP (NMFS, 2006).

7.1 Introduction

Mandates to conduct social impact assessments come from both the NEPA and the Magnuson-Stevens Act. NEPA requires federal agencies to consider the interactions of natural and human environments by using a “systematic, interdisciplinary approach, which would ensure the integrated use of the natural and social sciences... in planning and decision-making” (§102(2)(A)). Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects, which may be direct, indirect, or cumulative. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. With an increasing need for management action, the consequences of these actions need to be examined in order to mitigate the negative impacts experienced by the populations concerned.

Social impacts are generally the consequences to human populations that follow from some type of public or private action. They may include alterations to the ways people live, work or play, relate to one another, and organize to meet their needs. In addition, cultural impacts, which may involve changes in values and beliefs that affect people’s way of identifying themselves within their occupation, communities, and society in general, are included under this interpretation. Social impacts analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts.

NMFS does not anticipate that this action would result in significant social impacts. There would likely be minor positive social impacts as a result of conducting the proposed research project due to improved fishery data information, and a potential increase in swordfish landings which could result in positive socio-economic impacts for some communities. Perceived negative social impacts associated with conducting this research could occur in communities with high numbers of recreational anglers who target swordfish. Negative social impacts are possible because the research would be conducted aboard commercial vessels which would be setting PLL gear and harvesting HMS. The east coast of Florida is the primary region that would be sensitive to any potential impacts on the recreational fishing sector. In previous requests for EFPs in this region, NMFS received some opposition from the recreational sector. These concerns could potentially be mitigated due to the strict research protocols and monitoring requirements associated with the research project.

7.2 State and Community Profiles

Section 102(2)(a) of the National Environmental Policy Act requires Federal agencies to consider the interactions of natural and human environments by using “a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences in planning and decision-making.” Federal agencies should address the aesthetic, historic, cultural, economic, social, or health effects which may be direct, indirect, or cumulative. The Magnuson-Stevens Act also requires, among other matters, consideration of social impacts. Consideration of the social impacts associated with fishery management measures is a growing concern as fisheries experience variable participation and/or declines in stocks.

Profiles for HMS fishing communities were included in Chapter 9 of the 2006 Consolidated HMS FMP and updated in Chapter 6 of the 2015 Stock Assessment and Fishery Evaluation Report. The state most likely to be impacted by this action due to its proximity to the proposed research area is Florida. The specific communities that could potentially be impacted in Florida include Fort Pierce, Melbourne, Cocoa Beach, New Smyrna Beach, Daytona Beach, St. Augustine Beach, and Jacksonville Beach.

Regardless, none of the communities would be greatly impacted by the preferred alternative in this action because the proposed research area has been purposefully selected because it is far offshore and well north of the area where the vast majority of recreational anglers are concentrated. This is expected to reduce any perceived gear or resource conflicts with recreational fisheries originating out of these communities.

8.0 OTHER CONSIDERATIONS

8.1 National Standards

NMFS has determined that this proposed action is consistent with the Magnuson-Stevens Act and other applicable laws, subject to further consideration after public comment. The analyses in this document are consistent with the Magnuson-Stevens Act National Standards (NS) (see 50 C.F.R. Part 600, Subpart D for National Standard Guidelines)..

NS 1 requires NMFS to prevent overfishing while achieving on a continuing basis Optimum Yield (OY), from each fishery for the U.S. fishing industry. The preferred alternative is consistent with ongoing efforts to conserve and manage fish with NS1 and the NS1 Guidelines and rebuilding requirements under 16

U.S.C. § 1854(e)(4). The proposed exempted fishing activities are part of a scientific research project to evaluate PLL catches and catch rates of target and non-target species within areas currently closed to PLL gear; thus facilitating future management efforts to prevent overfishing of HMS in the Atlantic Ocean. Fish caught as a result of this exempted fishing activity would be counted against the appropriate quotas, which are consistent with annual catch limits and rebuilding plans for those species. For the reasons explained in Section 4, NMFS does not anticipate that the preferred alternative will result in overfishing of silky sharks, night sharks and dusky sharks or affect measures intended to prevent overfishing and rebuild stocks. Given the uncertainty in data available for the closed area and the issues related to these shark stocks, as well as the value of additional data on these shark species, NMFS has identified certain terms and conditions to appropriately limit interactions and mortality and to ensure that sharks are properly identified. The terms and conditions would include: 1) Fin clips and photographs be safely taken from all live sharks that are not being retained to confirm which species are actually being caught; 2) When three dusky sharks have been caught and discarded dead by a fishing vessel, a maximum PLL set soak time limit of ten hours is established for all sets deployed under this EFP; 3) if three additional dusky sharks are discarded dead, then that vessel could not make a trip inside the EFC PLL Closed Area for the remainder of the 12-month project period, unless otherwise authorized by NMFS; 4) all sharks dead at haul back (including prohibited species) or legally retained for sale would be biologically sampled (e.g., vertebra and reproductive organs removed) and sent to the SEFSC; 5) hooks and sets deployed inside and outside the EFC PLL Closed Area must be equipped with hook timers, in accordance with protocols established by NMFS, to determine when animals were captured and when mortality occurs; and 6) SEFSC shark scientists would provide training to the researchers, vessel captains, and observers before the project begins to ensure that they understand the distinguishing features and identification methodologies for these three shark species. In addition to these measures, NMFS will review data about shark interactions and mortality from the first year of research project operations and will consider additional permit terms and conditions if necessary for any subsequent authorized years.

NS 2 requires that conservation and management measures be based on the best scientific information available. The alternatives considered stock assessment, observer, and logbook data. Projected catches for outside the EFC PLL Closed Area were calculated using observer data from 2013 – 2015. Projected catches for inside the EFC PLL Closed Area were calculated using observer data obtained from the previous study conducted during 2008 – 2010. These data are considered the best scientific information available, although as explained in Section 4, the 2008-2010 study only conducted a small number of sets and the data were highly variable and thus uncertain for certain shark species.

NS 3 requires that, to the extent practicable, an individual stock of fish be managed as a unit throughout its range and interrelated stocks of fish be managed as a unit or in close coordination. The range of swordfish and other HMS caught in the PLL fishery extend beyond U.S. waters. The preferred alternative is consistent with NS3 because regulations governing these species apply throughout their range in U.S. federal waters from Maine to Texas, including the Gulf of Mexico and the Caribbean Sea. All federal requirements and quotas would apply to vessels participating in the proposed research project.

NS 4 requires that conservation and management measures do not discriminate between residents of different states. Furthermore, if it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation should be fair and equitable to all fishermen; be reasonably calculated to promote conservation; and should be carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. The alternatives

considered do not discriminate against fishermen in any state. The proposed research project would be open to six authorized vessels, but NMFS would consider other similar research projects submitted by other entities.

NS 5 requires that conservation and management measures should, where practicable, consider efficiency in the utilization of fishery resources with the exception that no such measure has economic allocations as its sole purpose. The alternatives considered are consistent with NS 5 because they would maintain current harvesting and processing efficiencies in the PLL fishery, to the extent practicable, while conducting important scientific research to maintain a sustainable fishery.

NS 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. The alternatives take into account technological and environmental variations that have occurred in the PLL fishery and the fishery resource, due to regulatory changes, stock status changes, and changes in temporal and spatial distribution of the various species. The project would examine the effects of allowing some fishing effort in the EFC PLL Closed Area to determine current differences in catches between open and closed areas and catch rates of target and non-target species.

NS 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication. NMFS considered the costs and benefits of the various alternatives both economically and socially and describes efforts to minimize costs and avoid unnecessary duplication under NS 7 in Chapters 3, 4, and 6 of this document.

NS 8 states that conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts on such communities. The preferred alternative is consistent with NS 8. NMFS considered community impacts in Chapter 8. None of the affected communities would be significantly impacted by the preferred alternative because the proposed research area has been purposefully selected because it is far offshore and well north of where the vast majority of recreational anglers in Florida are concentrated. This is expected to reduce any perceived gear or resource conflicts with recreational fisheries originating out of these communities. Participating vessels could benefit from the project due to reduced steaming time to the fishing grounds and potentially larger catches of some target species.

NS 9 states that conservation and management measures shall, to the extent practicable, minimize bycatch, and to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. The preferred alternative is consistent with NS 9. The proposed research project would evaluate PLL catches and catch rates of target and bycatch species within an area currently closed to PLL gear. All currently required bycatch and bycatch reduction regulations and reporting requirements would be adhered to by all participating vessels. In addition, after three dusky sharks are discarded dead by a vessel in the EFC PLL Closed Area, that vessel would be required to reduce the gear soak time to no longer than 10 hours when fishing in the EFC PLL Closed Area. Soak time would be calculated from the time the last hook enters the water to the time the first hook is removed from the water. If, after reducing soak time to no longer than 10 hours, an additional three dusky sharks are discarded dead, then that vessel could not make

a trip in the EFC PLL Closed Area for the remainder of the project period, unless otherwise permitted by NMFS.

NS 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea. The preferred alternative is consistent with NS 10 because no impact to safety of life at sea is anticipated to result. The proposed research area would not require fishermen to travel greater distances, fish in bad weather, or otherwise fish in an unsafe manner. Portions of the proposed research area may be closer to port for participating vessels, thus potentially improving safety of life at sea for participating vessels.

8.2 Paperwork Reduction Act

This action does not contain any new collection-of-information requirements for purposes of the Paperwork Reduction Act.

8.3 Federalism (E. O. 13132)

This action does not contain regulatory provisions with federalism implications sufficient to warrant preparation of a Federalism Assessment under E.O. 13132.

9.0 LIST OF PREPARERS

This Environmental Assessment was prepared by Richard Pearson, Craig Cockrell, Joseph Desfosse, George Silva, Randy Blankinship, Karyl Brewster-Geisz, and Margo Schulze-Haugen from the HMS Management Division, Office of Sustainable Fisheries. Please contact the HMS Management Division for a complete copy of current regulations for the Atlantic HMS commercial and recreational fisheries.

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Individuals in other offices within NOAA contributed, including the Office of General Counsel.

10.0 LIST OF AGENCIES AND PERSONS CONSULTED

Discussions relevant to the formulation of the preferred alternative and the analyses for this document involved input from several NMFS components and constituent groups, including: NMFS General Counsel for Enforcement and Fisheries and Protected Resources Section, NMFS Southeast Fisheries Science Center, and the members of the HMS Advisory Panel (which includes representatives from the commercial and recreational fishing industries, environmental and academic organizations, state representatives, and fishery management councils).

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12.0 DRAFT FINDING OF NO SIGNIFICANT ENVIRONMENTAL IMPACT

FOR THE APPROVAL OF AN EXEMPTED FISHING PERMIT (EFP) TO CONDUCT SCIENTIFIC RESEARCH AND EVALUATE CATCH RATES USING PELAGIC LONGLINE (PLL) GEAR IN A PORTION OF THE EAST FLORIDA COAST (EFC) CLOSED AREA OF THE ATLANTIC OCEAN ON COMMERCIAL FISHING VESSELS NATIONAL MARINE FISHERIES SERVICE

BACKGROUND

On November 3, 2016, Dr. David Kerstetter of NOVA Southeastern University submitted an application to the National Oceanic and Atmospheric Administration (NOAA) requesting an Exempted Fishing Permit (EFP) to conduct scientific research experiments on commercial fishing vessels using pelagic longline (PLL) gear in a portion of the EFC PLL Closed Area of the Atlantic Ocean.

In response to Dr. Kerstetter's request, the National Marine Fisheries Service (NMFS), Highly Migratory Species (HMS) Management Division is proposing to issue an EFP pursuant to the Magnuson-Stevens Act (MSA), Atlantic Tunas convention Act (ATCA) and 50 CFR part 648 or part 697. Generally, the issuance of an EFP allows a fishing vessel of the United States to conduct fishing activities, including fisheries-related research that would be otherwise prohibited. The issuance of this EFP would allow for the collection and evaluation of PLL catches and catch rates of target and non-target species using commercial fishing vessels within a portion of the East Florida Coast (EFC) PLL Closed Area to evaluate the effectiveness of existing area closures at meeting current conservation and management goals under current conditions. Six commercial PLL vessels (with up to seven "backup" vessels) would be authorized to deploy a maximum of 45 sets/vessel/quarter using non-offset 16/0 or larger circle hooks (up to 750 hooks per set) both within and outside the EFC PLL Closed Area for one year to conduct scientific research using standardized PLL gear (see figure above). The project would be evaluated annually and could be reauthorized for no more than two additional years. A maximum of 1,080 sets (six vessels x 180 sets/year) would be deployed annually, with 2/3rds of the sets (720 sets) occurring within the EFC PLL Closed Area and 1/3 (360 sets) occurring in open areas. Vessels would be subject to 33 percent observer coverage (a minimum of 15 observed sets per quarter per vessel with five sets in each of the three sub-areas) using either NMFS-trained observers or scientific research staff. Vessels would be required to adhere to current PLL regulations including dehooking and safe handling protocols for sea turtles and other protected species (July 6, 2004; 69 FR 40734). Vessels would be allowed to retain swordfish, tunas, and sharks (subject to applicable quotas, seasons, minimum sizes, and retention limits at the time of the research project) to compensate for the costs of conducting research project operations under NMFS protocols. All at-sea fisheries observers would use NOAA Pelagic Observer Program protocols and forms to ensure data compatibility with current federal data collection, and all at-sea video from the electronic monitoring system would be reviewed and maintained by NOAA in accordance with current federal regulations.

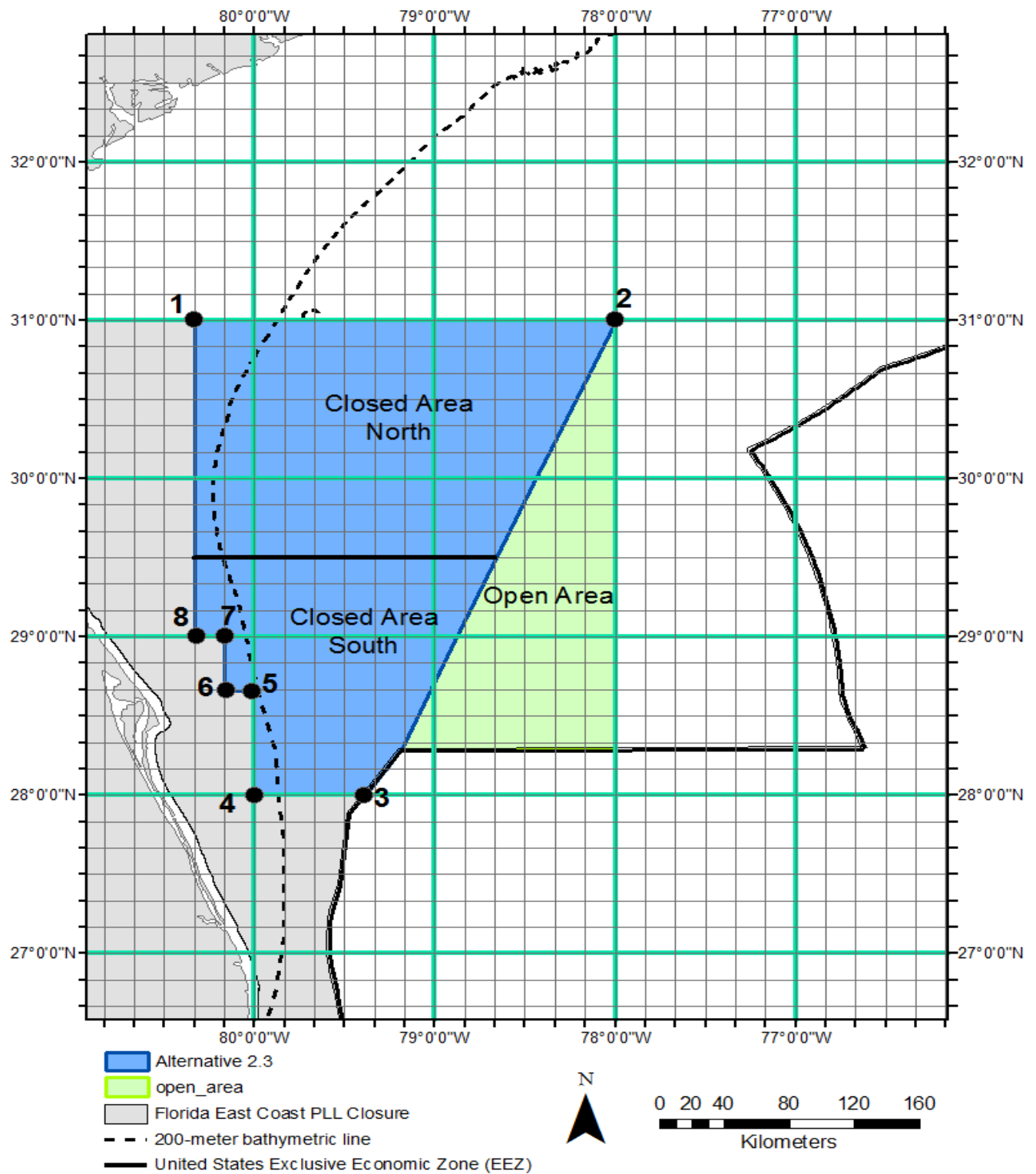
In accordance with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. §§ 4321 *et seq.*), NMFS prepared an Environmental Assessment (EA) titled, "*Issuance of an Exempted Fishing Permit to Conduct Scientific Research Using Pelagic Longline Gear in a Portion of the East Florida Coast Closed Area of the Atlantic Ocean*" (hereinafter, EA). This Finding of No Significant Impact (FONSI) evaluates the significance of the impacts of the selected alternative – Alternative 3 (Preferred Alternative) – which is to issue the EFP to conduct year-round research with commercial pelagic longline vessels in the EFC PLL

Closed Area seaward of a straight line connecting 31° 00" N. Lat., 80° 20" W. Long, to 29° 00" N. Lat., 80° 20" W. Long. and then proceeding southward in straight lines located just west of the 100 fathom isobath to 28° 00" N. Lat., 80° 10" W. Long. (see chart below). . The responses in this FONSI are supported by the analyses in the EA as well as in the other National Environmental Policy Act (NEPA) documents referenced. Copies of the EA are available at the following address:

Highly Migratory Species Management Division, F/SF1
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910
(301) 427-8503

or

<http://www.nmfs.noaa.gov/sfa/hms>



ANALYSIS

The Council on Environmental Quality regulations at 40 C.F.R. § 1508.27 state that the significance of an action should be analyzed both in terms of context and intensity. Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. These include:

1. Can the action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?

No. Approval of this exempted fishing permit would not jeopardize the sustainability of any target species, because any such catches would be counted against, and stay within, the appropriate species specific quotas. The exempted fishing permit would allow a specified number of PLL fishing vessels the opportunity to conduct catch and bycatch research consistent with conservation and management objectives of the MSA, ATCA, and other applicable law. Target species include swordfish, yellowfin tuna, and bigeye tuna, which are currently subject to active fishing in open areas. Investigation of catch and bycatch rates in the EFC PLL Closed Area would provide updated information important for future fishery management, which could enhance efforts to maintain healthy and sustainable fisheries.

2. Can the action be reasonably expected to jeopardize the sustainability of any non-target species?

No. The action is not expected to jeopardize the sustainability of any non-target species, because such catches would be counted against, and stay within, the appropriate species-specific quotas or incidental take levels. NMFS estimates that leatherback and loggerhead sea turtle interactions would be reduced if the EFP were approved (versus if the same amount of fishing effort were to occur only in open areas). Prior research in the EFC closure area from 2008 – 2010 found no interactions with marine mammals. Similarly, only five observed interactions occurred in the open area of the FEC from 2013 -2015 based upon observer data (2015: one pilot whale; 2014: one pan-tropical spotted dolphin; 2013: one unidentified marine mammal; one unidentified beaked whale, one Minke whale). With such low interaction rates, an extrapolation would yield less than one animal given the effort proposed in the research study. Therefore, the anticipated impact on marine mammals is minimal. NMFS anticipates that overall bycatch of blue marlin, white marlin, and bluefin tuna would decrease. Bycatch of sailfish could increase, however projections indicate that most sailfish would be released alive. To limit shark interactions and bycatch mortality and ensure that sharks are properly identified, the preferred alternative would include several terms and conditions for the EFP. The first requirement would be that fin clips and photographs be safely taken from all live sharks that are not being retained to confirm which species are actually being caught. Additional terms and conditions would include: 1) When three dusky sharks have been caught and discarded dead by a fishing vessel, a maximum PLL set soak time limit of ten hours is established for all sets deployed under this EFP; 2) if three additional dusky sharks are discarded dead, then that vessel could not make a trip inside the EFC PLL Closed Area for the remainder of the 12-month project period, unless otherwise authorized by NMFS; 3) all sharks dead at haul back (including prohibited species) or legally retained for sale would be biologically sampled (e.g., vertebra and reproductive organs removed) and sent to the SEFSC; and, 4) hooks and sets deployed inside and outside the EFC PLL Closed Area must be equipped with hook timers, in accordance with protocols established by NMFS, to determine when animals were captured and when mortality occurs. While misidentification of sharks is problematic, NMFS is confident that dusky sharks could be distinguished from the other shark species by the authorized samplers because all dead sharks would be required to be brought onboard as a condition of the EFP. This would provide sufficient time for proper shark identification. Furthermore, SEFSC shark

scientists would provide training to the researchers, vessel captains, and observers before the project begins to ensure that they understand the distinguishing features and identification methodologies for these three shark species. Overall, the investigation of catch and bycatch rates in the EFC PLL Closed Area could allow for future improved bycatch reduction techniques.

3. Can the action be reasonably expected to allow substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in FMPs?

No. NMFS completed reviews of HMS fishing gear impacts in the 1999 FMP, Amendment 1 to the 1988 Billfish FMP, the 2006 Consolidated HMS FMP, Amendment 1 to the 2006 Consolidated HMS FMP, and the 2015 Final 5-Year Review of Atlantic HMS EFH. These analyses determined that PLL gear is fished within the upper water column and does not make contact with the sea floor. Most HMS reside in the upper part of the water column and habitat preferences are likely influenced by oceanic factors such as current confluences, temperature edges, and surface structure. PLL gear is fished in the upper water column and does not pose any adverse impact to HMS EFH. In Draft Amendment 10 to the Consolidated Atlantic HMS FMP, NMFS did not find any significant changes in impacts to HMS EFH from HMS and non-HMS fishing gears since the gear analysis was conducted for Amendment 1 and the Final Atlantic HMS EFH 5-Year Review document.

4. Can the action be reasonably expected to have a substantial adverse impact on public health and safety?

No. The proposed action would impact domestic fishing vessels that would otherwise be fishing in open areas of the Atlantic Ocean. Because this action is not expected to change current fishery practices and behaviors, no effects to public health and safety are anticipated from implementation of the EFPs.

5. Can the action be reasonably expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species?

No. The proposed action would not have an adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species. An increase in overall PLL fishing effort is not anticipated because participating vessels would otherwise be fishing in open areas of the Atlantic Ocean if they were not participating in the proposed research project.

Incidental takes of, or interactions with, protected species that are listed as threatened or endangered under the Endangered Species Act (ESA) taking place under the EFP would be counted against the authorized incidental take levels specified in the June 2004, Biological Opinion (BiOp) for the Atlantic HMS PLL fishery. The effect of Atlantic HMS PLL fleet operations is the subject of an ongoing ESA Section 7 consultation. Reinitiation of consultation was requested on March 31, 2014, to reassess impacts on listed species, including several turtle species. Pending completion of consultation, the PLL fishery continues to operate consistent with the Reasonable and Prudent Alternative (RPA) and Terms and Conditions specified in a 2004 Biological Opinion (e.g., hook type, bait type, careful release and disentanglement gear, mandatory training workshops). NMFS has made a determination that the continued operation of the PLL fishery during consultation does not constitute an irretrievable or irreversible commitment of resources in accordance with section 7(d) of the ESA and that continued compliance with the RPAs and Reasonable and Prudent Measures in existing biological opinions will avoid jeopardy to listed species. The proposed research project is not anticipated to affect listed species in any way not previously analyzed

in previous BiOps because an overall increase in PLL fishing effort is not anticipated. The projected interactions would not cause the ITS in the 2004 Biological Opinion for the PLL fishery to be exceeded, and would not be expected to jeopardize the continued existence of sea turtles.

Prior research in the EFC closure area from 2008 – 2010 found no interactions with marine mammals. Similarly, only five observed interactions occurred in the open area of the FEC from 2013 -2015 based upon observer data. With such low interaction rates, an extrapolation would yield less than one animal given the effort proposed in the research study. Therefore, the anticipated impact on marine mammals is minimal.

6. Can the action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (*e.g.*, benthic productivity, predator-prey relationships, etc.)?

No. The proposed action is not expected to result in substantial impact on biodiversity and ecosystem function within the affected area, because the proposed action is not expected to increase fishing effort or change fishing practices, and/or interactions with non-target and endangered or threatened species because these vessels would be fishing elsewhere if they not participating in the research project. To ensure that shark bycatch mortality, particularly dusky shark mortality, is minimized, PLL soak times would be reduced after three dusky sharks are discarded dead and, if three additional dusky sharks are discarded dead, that vessel would be prohibited from fishing in the EFC PLL Closed Area for the remainder of the project period. Additionally, participating vessels would be required to abide by all other existing fishery regulations including, but not limited to: circle hook requirements, bait restrictions, careful release protocols, VMS requirements, electronic monitoring requirements, logbook reporting requirements, quotas, retention limits, individual bluefin tuna quotas, minimum size limits, landing restrictions, a commercial billfish possession prohibition, authorized gears, and observer coverage.

7. Are significant social or economic impacts interrelated with significant natural or physical environmental effects?

No. There are no anticipated significant natural or physical environmental effects associated with the proposed action and no significant social or economic impacts interrelated with natural or physical environmental effects that would result from the action. NMFS has conducted an economic analysis of the proposed scientific research project. The economic impact of the project is not expected to be significant. Therefore, no interrelated significant natural or physical environmental effects are expected. The exempted fishing permit would allow participating vessels to conduct catch and bycatch research in the EFC PLL Closed Area. These vessels would be allowed to retain and sell legal and legal-sized species as compensation to offset the increased economic costs associated with conducting the scientific research.

8. To what degree are the effects on the quality of the human environment expected to be highly controversial?

The effects on the quality of the human environment associated with this action are not expected to be highly controversial because a significant change in fishing effort or fishing practices is not anticipated. These vessels would otherwise be actively fishing in open areas of the Atlantic Ocean if the proposed research project were not conducted. Further, all research would be conducted under strict scientific protocols with enhanced observer coverage (33 percent) and 100% electronic monitoring. There may be some opposition or concern from environmentalists, recreational fishermen, and potentially other interested parties that are opposed to any PLL fishing effort in the EFC PLL Closed Area. A small, but

similar, research project comparing catch and catch rates within the EFC and Charleston Bump Closed Areas from 2008-2010 generated public controversy at the time. The proposed project area was selected to reduce public controversy because the research activities would occur in areas not heavily utilized by recreational fisheries. Additionally, all participating vessels would be required to abide by other existing regulations including, but not limited to: circle hook requirements, bait restrictions, careful release protocols, VMS requirements, electronic monitoring requirements, reporting requirements, quotas, retention limits, individual bluefin tuna quotas, minimum size limits, landing restrictions, a commercial billfish possession prohibition, authorized gears, and observer coverage.

9. Can the action be reasonably expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

No. This action would not result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas because fishing effort would occur primarily in offshore areas, and within the upper oceanic water column of the Atlantic Ocean. The waters of the Florida Straits, bordered approximately from Key West through West Palm Beach, Florida out to the border of the U.S. Exclusive Economic Zone, particularly from the Middle Keys through Fort Lauderdale, are known nursery grounds for juvenile swordfish. However, all of this proposed research would occur northward of 28°N (approximately Fort Pierce), which is north of the main nursery grounds. In addition, there are no park land, prime farmlands, wetlands, or wild and scenic rivers within the action area so there would be no impacts to these areas. Therefore, none of the unique areas listed above occur within the proposed action area.

10. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

No. Effects on the human environment are not likely to be highly uncertain and do not involve unique risks. The effects of PLL fishing are well known and documented. Duplicate monitoring methods (including electronic monitoring and a 33 percent observer coverage rate) and frequent communication between the Principal Investigator and NMFS staff would help ensure that any unforeseen problems or environmental impacts are quickly addressed. Approval of an exempted fishing permit to compare catch and catch rates between open and closed areas would result in predictable, beneficial impacts that could aid in future fishery management.

11. Is the action related to other actions with individually insignificant, but cumulatively significant impacts?

No. NMFS does not anticipate there to be any significant cumulative ecological, economic, and social impacts. The proposed action would issue an EFP to participating vessels to compare catch and catch rates between open and closed areas. The EFP is not expected to increase fishing effort, or cause significant ecological, economic, or social impacts. The alternatives analyzed in this EA would continue to prevent overfishing without jeopardizing the sustainability of any target or non-target species. The proposed research project is of limited scope and duration with a specified number of participating vessels and amount of allowable sets. All catches would be counted against, and stay within, established species specific quotas. Additionally, participating vessels would be required to abide by other existing regulations including, but not limited to: circle hook requirements, bait restrictions, careful release protocols, VMS requirements, electronic monitoring requirements, reporting requirements, quotas,

retention limits, individual bluefin tuna quotas, minimum size limits, landing restrictions, a commercial billfish possession prohibition, authorized gears, and observer coverage.

12. Is the action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

No. The proposed action would occur in offshore waters of the Atlantic ocean and would not occur in any areas listed or eligible for listing in the National Register of Historic Places, and would not cause loss or destruction of significant scientific, cultural, or historical resources because there are no significant scientific, cultural, or historic resources within the proposed action area.

13. Can the action be reasonably expected to result in the introduction or spread of a non-indigenous species?

No. The proposed action is not expected to result in any significant change in fishery patterns or behaviors. Most vessels in the PLL fishery have limited range and hold capacity and do not travel between ecologically different bodies of water or exchange ballast water. Thus, they do not contribute to the introduction or spread of non-indigenous species.

14. Is the action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

No. This action is not likely to establish a precedent for future actions because any similar scientific research programs would be evaluated on their individual merits.

15. Can the action be reasonably expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

No. The action would be consistent with the Magnuson-Stevens Act and the HMS regulations at 50 CFR § 635. The proposed action would not be expected to violate any Federal, state, or local law or requirement imposed for the protection of the environment.

16. Can the action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

No. The proposed research project is of limited size, scope, and duration with a specified number of participating vessels and amount of allowable sets. The research project involves PLL vessels which would otherwise be fishing in open areas of Atlantic Ocean. All exempted fishing activity would be conducted under strict scientific research protocols. Overall, a domestic quota controls catches in the swordfish fishery and many other species with which PLL vessels interact. All catches associated with the research project would be counted against, and stay within, these established species specific quotas. Additionally, all participating vessels would be required to abide by all other existing fishery regulations including, but not limited to: circle hook requirements, bait restrictions, careful release protocols, VMS requirements, electronic monitoring requirements, reporting requirements, quotas, retention limits, individual bluefin tuna quotas, minimum size limits, landing restrictions, a commercial billfish possession prohibition, authorized gears, and observer coverage.

In view of the information presented in this document and the analyses contained in the attached Environmental Assessment prepared by NMFS regarding the approval of an exempted fishing permit to conduct scientific research using PLL gear onboard commercial fishing vessels in the EFC PLL Closed Area of the Atlantic Ocean, it is hereby determined that this action will not significantly impact the quality of the human environment. In addition, all impacts to potentially affected areas, including national, regional and local, have been addressed to reach the conclusion of no significant impact. Accordingly, preparation of an EIS for this action is not necessary.

-DRAFT-

Alan D. Risenhoover, Director
Office of Sustainable Fisheries

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